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Bulletin 330

Vocational-Industrial Education in Pennsylvania

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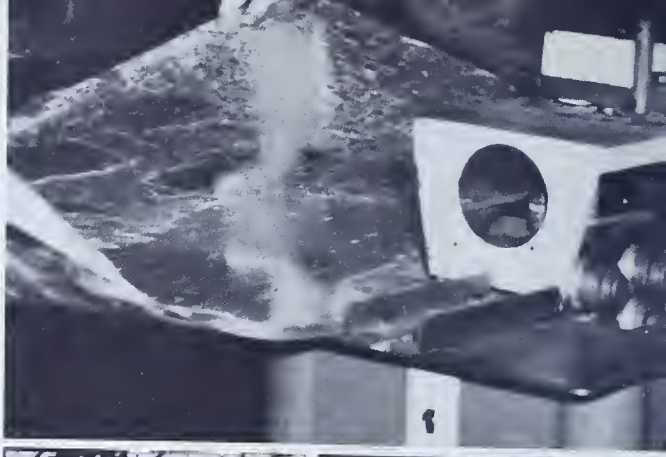
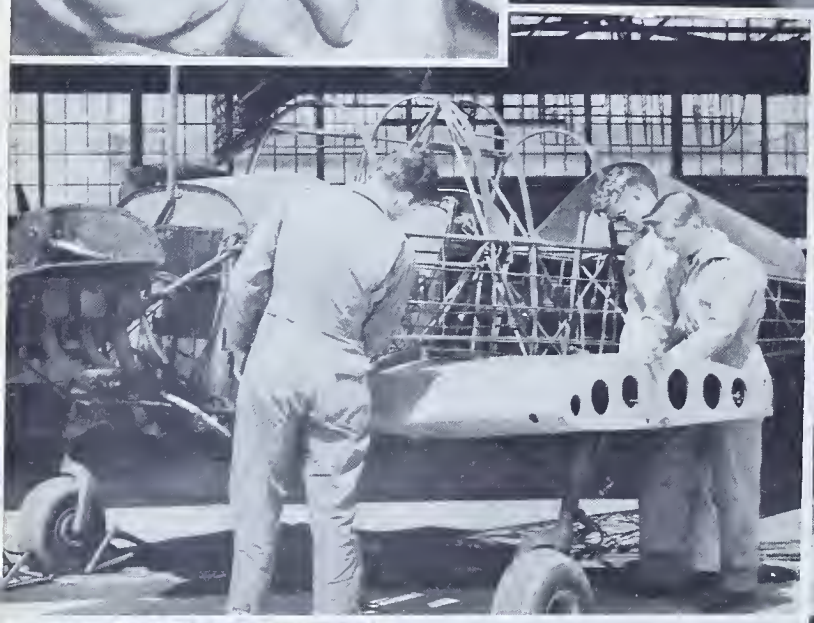
DEPARTMENT OF PUBLIC INSTRUCTION
HARRISBURG





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CONTROL
SWITCH
VOLUME
GRADE CURRENT
METER SWITCH

Bulletin 330

Vocational-Industrial Education in Pennsylvania

Commonwealth of Pennsylvania
DEPARTMENT OF PUBLIC INSTRUCTION
Harrisburg • 1951

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FOREWORD

Learning to Lay Glass Block

Williamsport School photo

THIS FOREWORD gratefully acknowledges the painstaking ought, research, and written expression on the part of many persons ho have made valuable contributions to this bulletin.

The bulletin contains pertinent data on the establishment of the nctional operation of vocational-industrial schools and departments of gh schools in the Commonwealth of Pennsylvania.

A careful reading of this material by Pennsylvania educators will nswer in full detail many questions pertaining to vocational-industrial lucation.

The work of preparing this bulletin was organized by Robert T. oner, Chief, Trade and Industrial Education, under the general direc-on and guidance of Paul L. Cressman, Director of the Bureau of struction. Final editing was done by Rachel S. Turner, Editor for the epartment of Public Instruction.

ebruary 1952

Francis B. Haas

Superintendent of Public Instruction

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Commonwealth of Pennsylvania
DEPARTMENT OF PUBLIC INSTRUCTION
Harrisburg • 1951

Learning Motor Testing

Coatesville School photo

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Learning to be a Coppersmith

Philadelphia School photo

Proctice in Electricol Installotion for Civil Defense

Lebanon School photo

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Testing Auto Engines

Pittsburgh School photo

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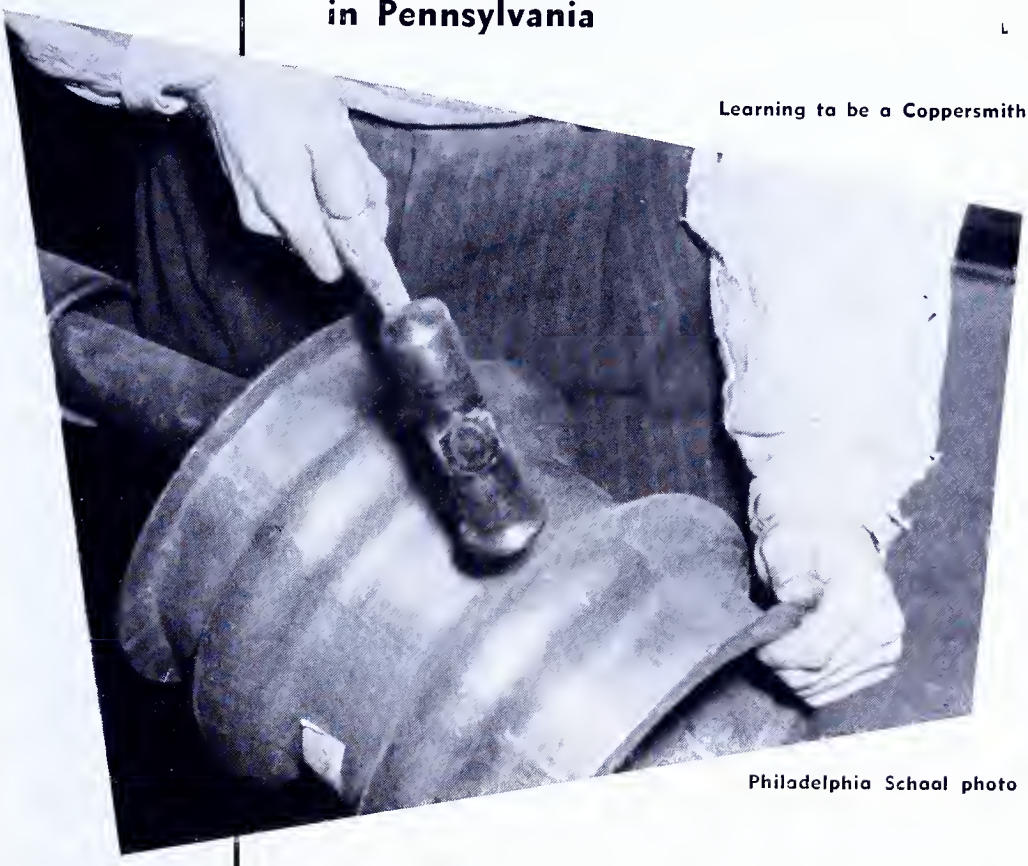
I

Background and Growth of Vocational-Industrial Education in Pennsylvania



Learning to be a Coppersmith

Philadelphia School photo

Enrichment of the Total Educational Program

Growth of Vocational-Industrial Education in Pennsylvania

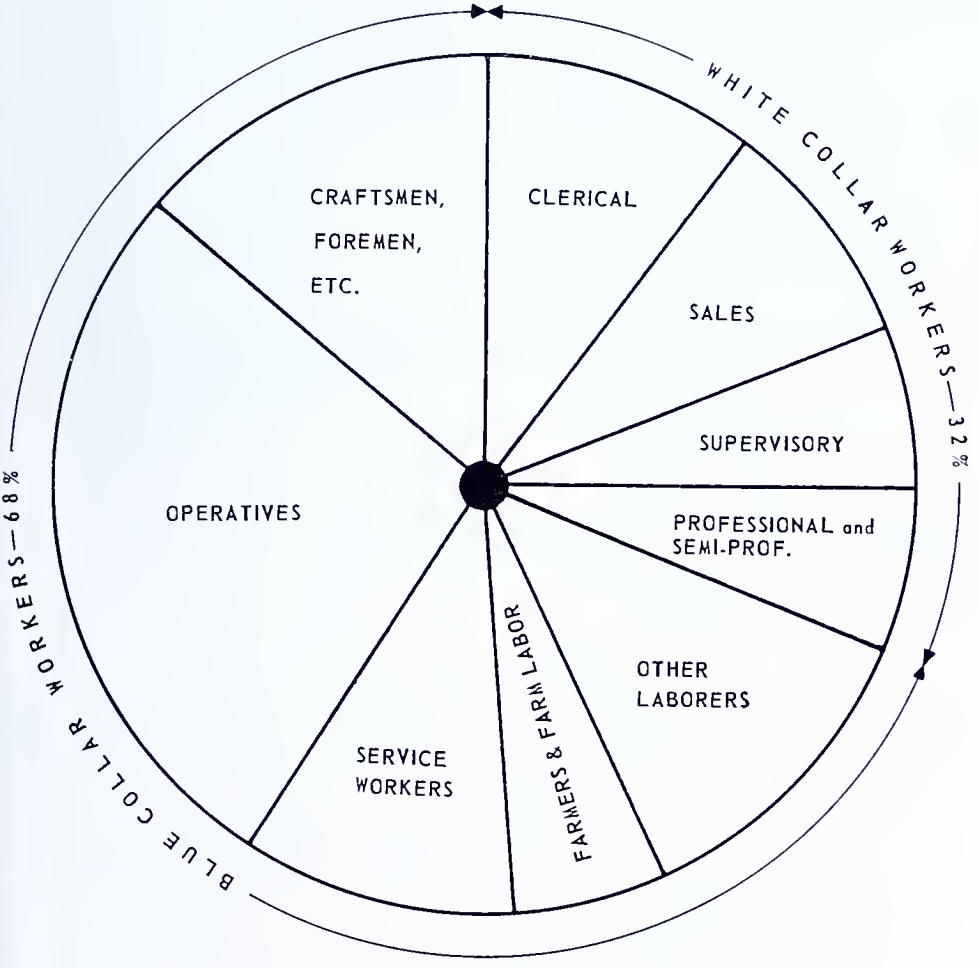
Number of Vocational Programs in Pennsylvania

Different Occupations Taught

I

Background and Growth of Vocational-Industrial Education

VOCATIONAL-INDUSTRIAL Education has had a steady growth and increasing recognition as an integral part of the total program of education in Pennsylvania. In a State recognized as one of the greatest industrial centers of the world, employing a large percentage of its workers in blue collar jobs, see Figure 1, Industrial Education should be



Pennsylvania Chamber of Commerce Repart, October, 1946
FIGURE 1.—Division of White and Blue Collar Workers

an essential part of the educational program. A gradual change in curricular offerings since the beginning of the free public school system in 1834 has tended to make our educational program more realistic, thereby more nearly meeting the needs of both youth and adults.

Enrichment of the Total Educational Program

Vocational-Industrial Education, a practical-skill training for youth and adults, is one of the subjects which has enriched our total educational program. It has developed to its present status either directly or indirectly through analysis of the needs of individuals in preparation for life activity. Recent surveys by the Pennsylvania Chamber of Commerce, the Pennsylvania Economy League, and local surveys have indicated the need for public schools to provide opportunity for pupils to prepare for the trades by including industrial education in the curriculum. Retrospectively, industrial education has developed due to the interest of groups of individuals who have developed legislation for the establishment of practical shop training in our schools. To provide a background of information relative to the growth of industrial education, a brief resumé of pertinent historical facts and data relative to its present status follows.

Growth of Vocational-Industrial Education in Pennsylvania

Pennsylvania from early colonial times has indicated an interest in training for the trades. Much of this early training was on the basis of the development of hand-skills. William Penn and Thomas Budd expressed the need for skill training. Early schools such as the Cloisters near Ephrata and those of the Moravians included hand-skill training in their educational program.

The inception of the factory system developed an interest on the part of trade associations in improving the abilities of the workers in the groups. During the period 1800 to 1900, practical training was included in public school curriculums and the following schools were established to train workers for industrial pursuits:

1. Mechanics Institute, now known as the Franklin Institute, founded in Philadelphia, 1824
2. Pittsburgh Mechanics Institute, 1830
3. Manual Labor Academy of Germantown, 1829
4. Avery Trade School for Negroes, Pittsburgh, 1850

Learning Diesel Engine Construction

Williamsport School photo

5. Spring Garden Institute, Philadelphia, opened lecture courses for artisans in 1851
6. Swarthmore College equipped shops for engineering students, 1871
7. Mechanical drawing was included in annual reports of the Superintendent of Public Schools in Allentown, Chester, and Philadelphia, 1872
8. Sixteen schools included in their curriculums some recognition of industrial education, 1876
9. Three public schools indicated that they conducted evening classes, 1876
10. Tidioute schools introduced Manual Training, 1882
11. Girard College added its first shops for teaching handwork, 1882
12. First Public Manual Training School in Philadelphia at 17th and Wood Streets was opened, 1890
13. The Lea School, later to become the Northeast Manual Training School in Philadelphia, established, 1890

Learning Wotchmokin

Philadelphio School photo

Other influences in practical training during this period were th exhibits at the Centennial Exposition in Philadelphia in 1876. In 187 J. P. Wickersham, the Superintendent of Public Instruction, wrote : length upon the necessity for including industrial education in th curriculum.

By 1900 industrial education in the public schools of Pennsylvan showed the following statistics:

34 public school districts had drawing of some kind.
8 districts had shops.
4 districts had manual training.
1 district had a carpenter shop.
1 district had industrial work.
1 district had printing.

Other manual training schools were opened as a result of public effort private donation. One such school was opened in 1903 at Homestead, the result of a gift of $125,000 by C. M. Schwab. The Philadelphia de School was established in Philadelphia in 1906, followed in 1912 the opening of a trade school in Pittsburgh. York was the first city Pennsylvania to initiate cooperative education between school and ustry. This program was set up in 1911 and patterned after a similar in operation at that time in Fitchburg, Massachusetts. Johnstown anized a similar program of cooperative education in 1914.

Meanwhile these changes in educational opportunities were making mselves felt through the General Assembly at Harrisburg. In 1887 ommission was appointed to make an intensive study of industrial cation at home and abroad. The commission made eleven specific mmendations to the General Assembly as a result of its study. After eful consideration by that body the recommendations were dropped nsatisfactory. Another commission was appointed in 1907 and made eport in 1909. This report was likewise ineffective.

The early years of the twentieth century saw clarification and change orable to the advancement of industrial education. The philosophies ndustrial education and manual training, conflicting and confusing in many areas, were clarified and their respective fields of influence more ply defined. Many of the manual training high schools were tending, e unconsciously, some with declared intention, toward vocational cation. The School Code of 1911 authorized any Board to establish, ip, and maintain manual training schools and vocational schools. It cted the State Superintendent of Public Instruction to ". . . appoint expert assistant in agricultural education, one expert assistant in ustrial education, one expert assistant in drawing."

s one might expect, such public and private effort on the local level ld eventually bring about legislation favorable to the further advance- t of industrial education. This occurred in May, 1913, when the walter Act was passed and signed by Governor Tener. The bill ned vocational education for the purposes of subsidization and, while id not greatly influence industrial education in the large school dis- s, it did serve to stimulate thinking and action in this phase of cation in the smaller and less able districts.

In 1917, Congress passed the Smith-Hughes Act aiming at the furthe ance of vocational education in the several states. In that same yea Pennsylvania was one of the first of the states to accept the provisio of the Smith-Hughes Act in order that Federal moneys might be spe in the State to further and develop the vocational education program o a state-wide basis. While these moneys did greatly aid trade trainin programs, few trade schools were opened as a result of this Federal ai The Showalter Act, which antedated by four years the Smith-Hugh Act, had been effective in this field of education.

Following acceptance of the provisions of the Smith-Hughes Act b Pennsylvania, three training centers for vocational teachers were set up- one in the eastern part of the State at the University of Pennsylvani another in the central part of the State at Pennsylvania State Colleg and a third in the western part of the State at the University of Pittsburg These centers have, since 1917, offered opportunities to prospecti teachers to meet professional teaching requirements; to obtain a colleg degree through part-time attendance; and to pursue advanced work i vocational teacher education and in fields related thereto.

Number of Vocational Programs in Pennsylvania

Through these influences and efforts on the part of interested ind viduals and groups of individuals, and through legislation, vocation industrial education has shown considerable progress during the fir half of this century. That it is endeavoring to meet the needs of yout and adults and is contributing to a constantly increasing number of st dents, may be construed from statistical data presented graphically i Figure 2:

Enrollment of youth of secondary school age in Vocational Industri Day Courses in Pennsylvania, 1920-1950.

Number of teachers employed in Vocational Industrial Day Scho Programs in Pennsylvania, 1920-1950.

Number of districts having Day Vocational Industrial Programs i Pennsylvania, 1920-1950.

Enrollment of adults in Evening Trade Extension Classes in Pennsy vania, 1920-1950.

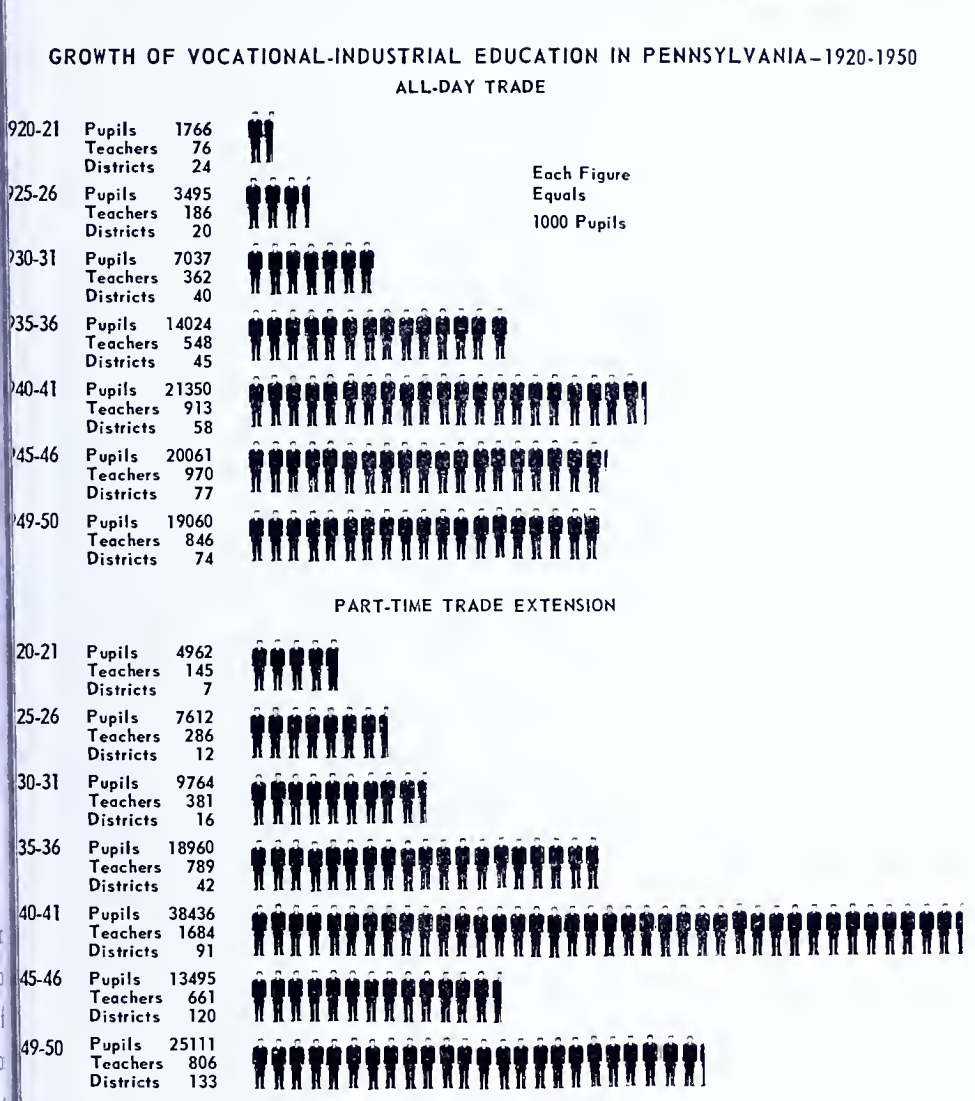

GROWTH OF VOCATIONAL-INDUSTRIAL EDUCATION IN PENNSYLVANIA–1920-1950
ALL-DAY TRADE
920-21 Pupils 1766 Teachers 76 Districts 24
925-26 Pupils 3495 Teachers 186 Districts 20
930-31 Pupils 7037 Teachers 362 Districts 40
935-36 Pupils 14024 Teachers 548 Districts 45
940-41 Pupils 21350 Teachers 913 Districts 58
945-46 Pupils 20061 Teachers 970 Districts 77
949-50 Pupils 19060 Teachers 846 Districts 74
Each Figure Equals 1000 Pupils
PART-TIME TRADE EXTENSION
20-21 Pupils 4962 Teachers 145 Districts 7
25-26 Pupils 7612 Teachers 286 Districts 12
30-31 Pupils 9764 Teachers 381 Districts 16
35-36 Pupils 18960 Teachers 789 Districts 42
40-41 Pupils 38436 Teachers 1684 Districts 91
45-46 Pupils 13495 Teachers 661 Districts 120
49-50 Pupils 25111 Teachers 806 Districts 133

FIGURE 2.—Growth of Vocational-Industrial Education in Pennsylvania

Number of teachers employed in Adult Evening Trade Extension Programs in Pennsylvania, 1920-1950.

Number of districts having Adult Evening Trade Extension Programs Pennsylvania, 1920-1950.

As of June, 1950, 74 school districts were conducting Vocational-dustrial programs for secondary school youth, as shown in Figures 2 d 3.

At the same time there were 133 districts conducting extension pro-ams to meet the needs of adults, employed in industrial occupations as wn in Figure 2.

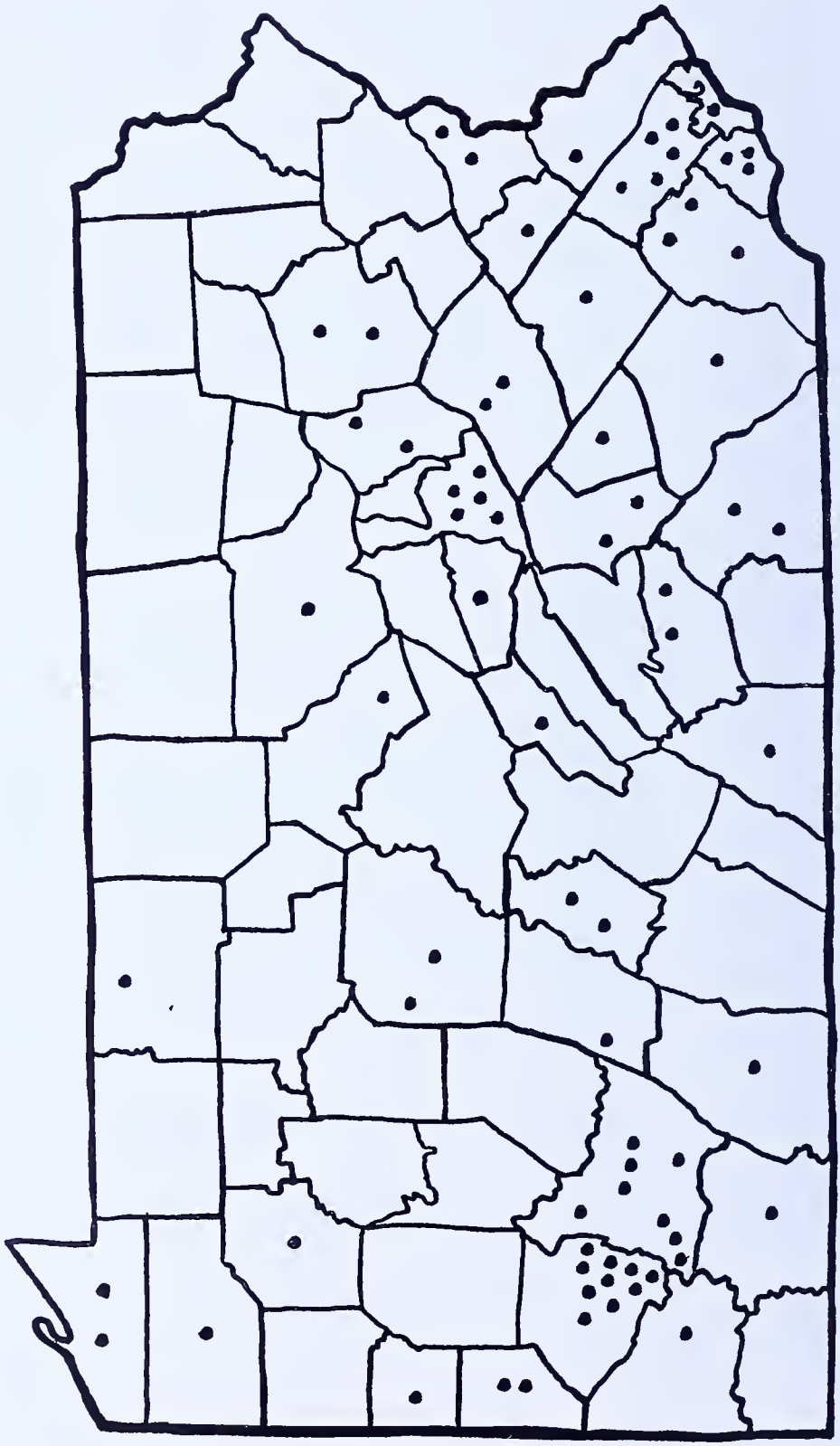


FIGURE 3.—Distribution of Vocational Trade and Industrial Day Programs by Counties

FIGURE 4.—Distribution of Vocational Trade and Industrial Extension Classes by Counties

Different Occupations Taught

In these programs, 77 different occupations were being taught, as listed below and on page 13:

- Aeronautics
- Auto Body Repair
- Auto Mechanics
- Beauty Culture
- Building Trades
  - General Construction
  - Bricklaying
  - Painting
  - Cement Finishing
  - Linoleum and Soft Tile
  - Masonry
  - Maintenance
  - Metal Lathing
  - Plastering
  - Plumbing
  - Steamfitting
- Cabinet Making
- Carpentry
- Ceramics
- Chemists—Industrial
- Child Care
- Commercial Art
- Drafting—Architecture
- Blueprint Reading
- Drafting—Machine Design
- Dry Cleaning and Pressing
- Electricity
  - Appliance
  - Construction
  - Maintenance and Power
  - Wiring
- Foods
  - Baking
  - Cafeteria Training
  - Cake Decorating
  - Dietetics
  - Meat Cutting
  - Preparation for
    - Restaurant Practice
    - Tea Room Training
- Glassworking
- Instrument Mechanics
- Interior Decorating
- Metal Trades
  - Boilermaking
  - Metallurgy
  - Foundry
  - Machine Shop
  - Sheet Metal

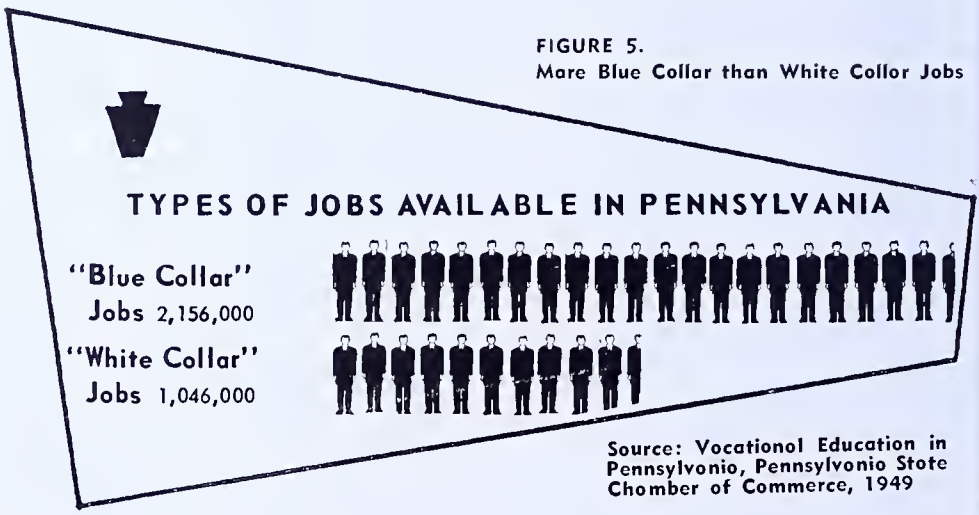
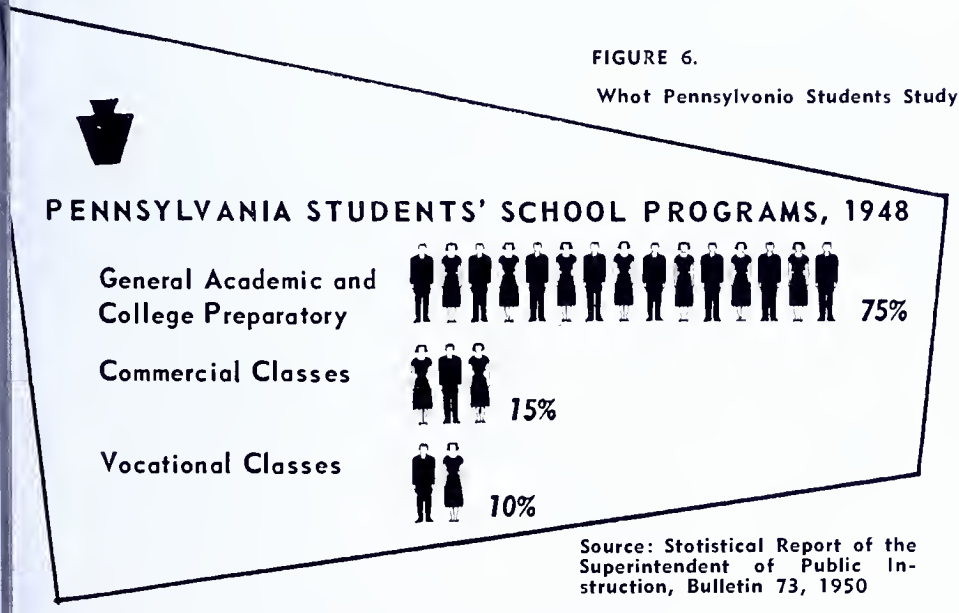


FIGURE 5.
Mare Blue Collar than White Collor Jobs

Source: Vocationol Education in Pennsylvonio, Pennsylvonio Stote Chomber of Commerce, 1949

lineral Industries
Anthracite
Bituminous
Combustion and Fuels
Maintenance
usic
ursing—Practical
ptics
aper Box Manufacturing
atternmaking
etroleum Refining
notography
pefitting
bwer Plant Operation
rinting
Composition
Linotype
Monotype
Offset Platemaking
Offset Presswork
Presswork
Railroad—Airbrake
Refrigeration
Shipfitting—Layout
Traffic Management
Supervisory Training
Textiles
Clothing
Dressmaking
Millinery
Paper Patternmaking
Power Sewing
Tailoring
Weaving
Upholstery and Drapery
Watchmaking—Repair
Welding

FIGURE 6.
Whot Pennsylvonio Students Study



Source: Stotistical Report of the Superintendent of Public Instruction, Bulletin 73, 1950

Figures 5 to 8 graphically present a comparative study of job opportunies in Pennsylvania, Pennsylvania's School Programs, and enrollment in al-day Vocational Courses.

The enrollment in 1948-49 in day-classes for secondary schools in the rious occupations was nearly 20,000, while the number of adults enlled for extension education approaches 24,000, including those enrolled the Public Service Institute. (Public Service Institute enrollment is

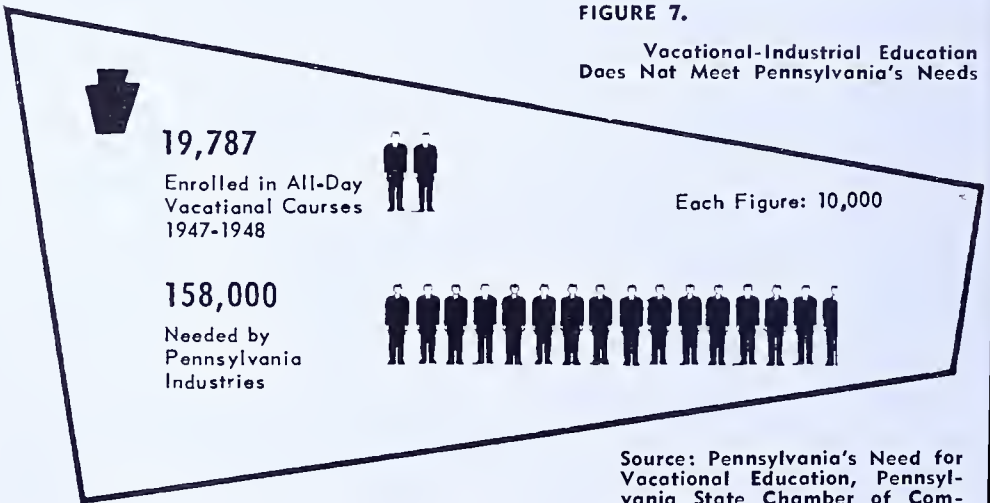
not included in Figure 8.) To provide instruction in these trades 50 teachers are employed on the day program and 710 are assigned to th adult extension program.

That Vocational-Industrial Education had gained recognition to th extent that it could serve the people not only in peacetime but also i an emergency was evidenced by the part it played during the secon World War. The Department of Public Instruction and local schoo districts, working in close cooperation with the Federal Governmen in 1940 developed a National Defense Program later to be known a the War Production Program. During the five years of its existenc 576,237 attended full-time industrial-education courses. This represente approximately nine per cent of the total trained in all war productio courses in the nation. In addition to this, 94,899 persons in industry wer given some type of supervisory training. This job was accomplished i addition to regular school duties and largely through the use of regula school plant facilities, school shop equipment, and school personnel.

Despite these evidences of constant growth, vocational-industrial edu cation has not expanded sufficiently to meet the immediate and futu demands which are now and will be made upon it. This need for expa sion exists and is looked for by many who today find such training u available. Evidence of this need was indicated in the Pennsylvan Chamber of Commerce Survey of October, 1949.

FIGURE 7.

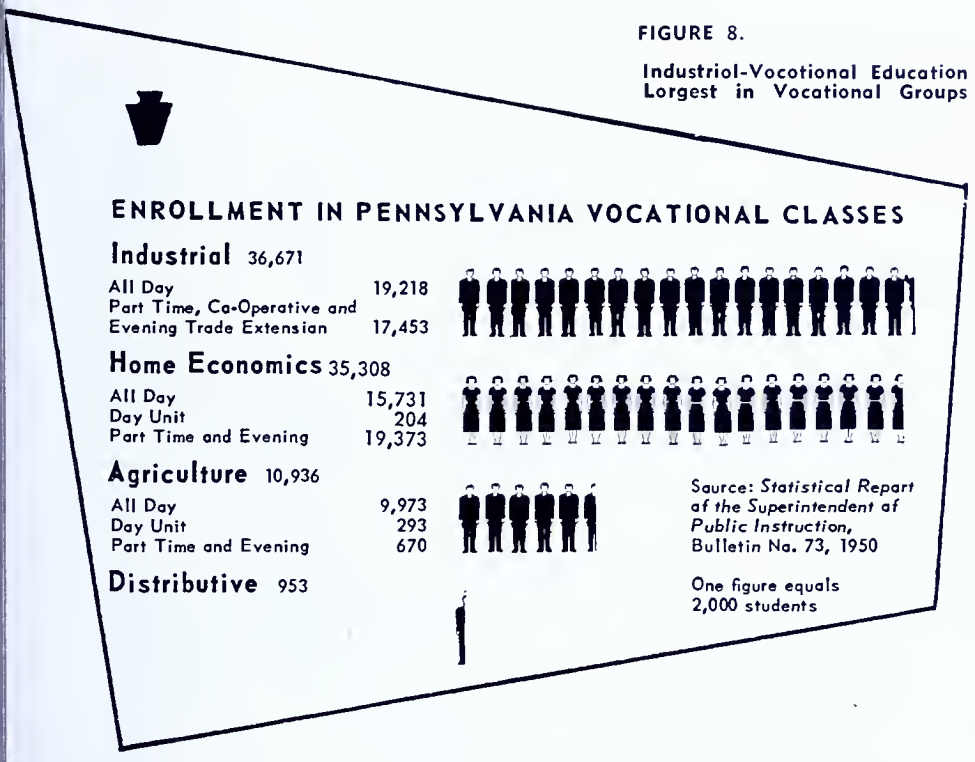
Vocational-Industrial Education Does Not Meet Pennsylvania's Needs



Source: Pennsylvania's Need for Vocational Education, Pennsylvania State Chamber of Commerce, 1949

FIGURE 8.

Industriol-Vocotional Education Lorgest in Vocational Groups


ENROLLMENT IN PENNSYLVANIA VOCATIONAL CLASSES
Industrial 36,671
All Day 19,218
Part Time, Co-Operative and Evening Trade Extensian 17,453
Home Economics 35,308
All Day 15,731
Day Unit 204
Part Time and Evening 19,373
Agriculture 10,936
All Day 9,973
Day Unit 293
Part Time and Evening 670
Distributive 953
Source: Statistical Repart af the Superintendent af Public Instruction, Bulletin Na. 73, 1950
One figure equals 2,000 students

Through the years vocational industrial education has served the needs of future workers. Those enrolled in our secondary schools are trained for some productive life activity, with emphasis on good citizenship. It has served adults through its trade extension program, which permits individuals to gain greater efficiency on their jobs, and consequently places them in the desirable position of being eligible for promotion. Vocational-industrial Education is and has been an asset to the total program of education in that it provides for the variety of needs of the pupils, thus creating community interest in the program and securing community support. Industry looks favorably toward the total education program if vocational-industrial courses are available to upgrade employed adults, and if such courses provide younger people with skills which will bring to industry more desirable job applicants. Finally, as was evidenced in the data on War Production Training outlined in this chapter, Vocational-Industrial Education contributes to the welfare of the nation.

II

The Program of Vocational-Industrial Education

Printing Pressroom in Action

Easton School photo

Four Major Divisions

Definition of Vocational-Industrial Education

Various Plans of Vocational-Industrial Education

Adult Education

Time Requirements

Shop Programs for the Public Schools of Pennsylvania

Learning to be a Painte

Philadelphia School photo

I

The Program of Vocational-Industrial Education

VOCATIONAL EDUCATION is a comprehensive, integral part of the whole program of education. It is generally considered to be education of less than college grade which prepares for successful entry into specific employment. In past years Vocational Education was misinterpreted to mean only those forms of education or training absolutely essential for the performance of specialized occupational skills. Now in the usually accepted sense, vocational education on the secondary level includes any and all knowledge and training that will contribute to a satisfying and useful life of employment. This means that the emphasis is on preparation for entry into an occupational field. It also includes education and training for those employed persons who need further knowledge or added skills to keep pace with changing conditions, thereby to secure their present positions, and to advance in the field of work in which they are engaged.

Emphasis is not to be placed solely on the development of skills and good habits of work. The whole educative process of the individual is of prime consideration. Vocational education not only tends to prepare an individual for successful employment through the development of competency to perform a job, but stresses character building and good citizenship. Therefore the goal of vocational education is to produce a competent worker and a citizen who is economically, socially, emotionally, and physically adjusted.

Four Major Divisions

Vocational Education, as provided for in the Smith-Hughes Act of 1918, included education in four major divisions:

1. Trade and Industrial Education.
2. Home Economics Education.
3. Agriculture Education.
4. Business and Distributive Education.

Under these divisions vocational education has developed in Pen sylvania and other states in an effort to meet the needs of youth and adul

Definition of Vocational-Industrial Education

Vocational Trade and Industrial Education, one of the divisions vocational education, is treated in detail in this bulletin. It is that for of education which is less than college grade and aims to fit persons f successful employment in the semiskilled or skilled trades, crafts, occupations. It also includes training instruction in the service trad and occupations usually considered as "technical instruction." It ai to develop manipulative skills, safe working practices, good worki habits, technical knowledge, related learning, and citizenship essential successful employment, advancement in the occupation, and success as respected member of society.

Therefore Vocational Trade and Industrial Education is specific a terminal. To accomplish the objectives it is essential that at least fif per cent of the total instruction time be spent in the school shops.

Another type of practical training is Industrial Arts, and since th also utilizes school shops it is essential that distinction be made betwe Industrial Arts and Vocational Trade and Industrial Education. Th distinction is primarily one of controlling purpose, teaching methods, a content analysis.

Industrial Arts is a field of *general education* that concerns itself p marily with tools, materials, processes, occupations, and products of man facture and construction. Its objectives tend toward orientation, avo tional interests, consumer education, exploration, social understandin and cultural relationships. It is not terminal or specific as is Vocation Industrial Education, and consequently it allots less time to shop wo than does Vocational-Industrial Education.

The provisions under the State Plan for Vocational-Industrial Educati outline a number of plans from which local districts may choose the o which best meets local needs to be included in their educational progra In general the State plan provides for the education of those persons w are:

1. Graduates, or about to graduate from high school, who are interes in obtaining work in the technical aspects of industry
2. In regular attendance in the public high schools

Learning Glass Blowing

Philadelphia School photo

3. About to leave school, or who have left school, who want short, intensive pre-employment training
4. Adults, unemployed, or about to be unemployed
5. Adults, desiring information or skills which will prepare them for a better position in their chosen occupation

Various Plans of Vocational-Industrial Education

The various plans of Vocational-Industrial Education are described briefly below as they appear in the State Plan for Vocational Trade and Industrial Education. Reference should be made to the State plan for more detailed information.

Plan A—The Vocational-Industrial Technical Curriculum

This plan prepares for employment in those occupations requiring technical knowledge beyond that of the skilled tradesman. It may involve production, maintenance, control, and certain aspects of supervision.

These technical occupations are usually on a level between that of the skilled tradesman and that of a college-trained engineer. The length of the vocational technical course depends upon the needs of the occupation, but must not exceed three years. Most of the instructional time is devoted to shop, laboratory, and related work. Up to 25 per cent of the time may be devoted to general education subjects. Candidates for entry into the vocational technical curriculum must have completed the eleventh grade and be 16 years of age. High school graduates are eligible.

Plan B—The Vocational-Industrial Unit Trade Curriculum

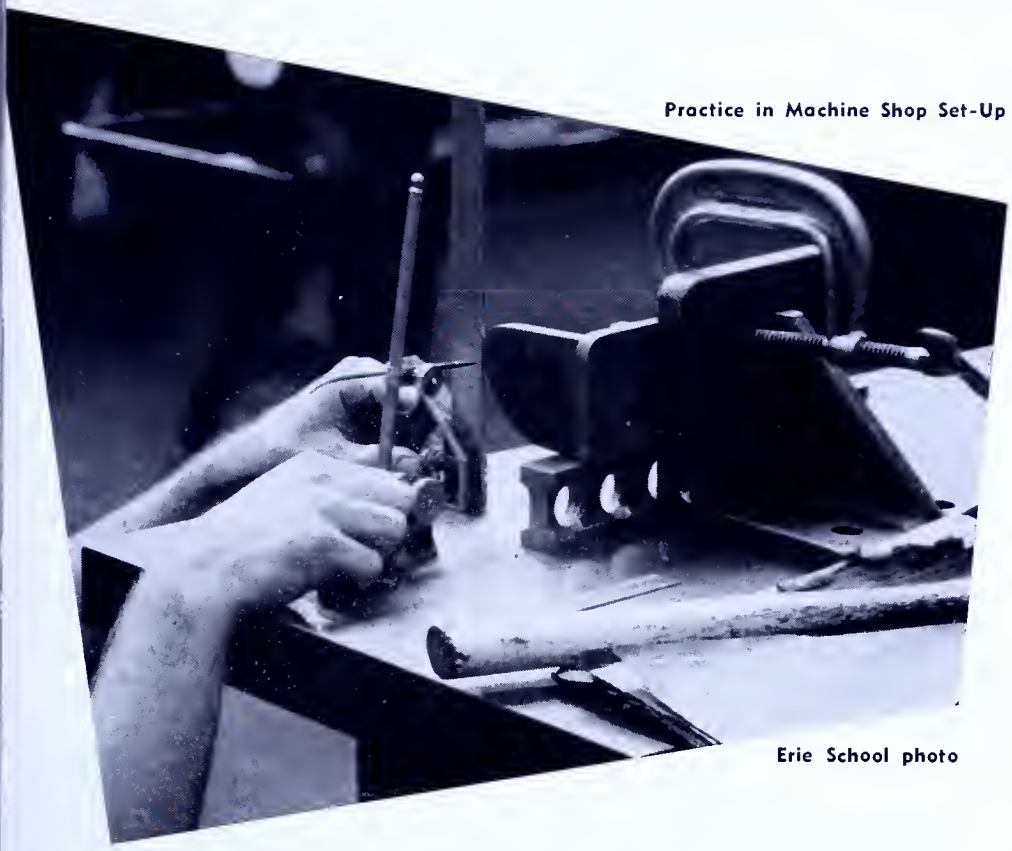
This plan prepares for successful entry into employment as an advanced learner or advanced apprentice. The student is taught only *one* specific skilled occupation. Half of the instructional time is devoted to practical or shop experience, approximately 25 per cent is allotted to related work, and the remaining 25 per cent is taken up with general education subjects. Students desiring to enter the vocational unit trade curriculum must be at least 14 years of age, have completed the ninth grade or its equivalent, be of at least average intelligence, and able to profit by the instruction.

Plan C—The Vocational-Industrial Occupational Curriculum

This plan prepares for successful entry into employment in one of several related trades or occupations. The program is intended for smaller communities when employment possibilities will not justify a Vocational Unit Trade Program (Plan B). In the Plan C program, one curriculum, for example, may include patternmaking, carpentry, and cabinetmaking. Another may consist of sequential processes such as metal patternmaking, foundry, and machine shop. The proportion of time devoted to the related and general education subjects, as well as the general admission requirements, are the same as in Plan B.

Plan D—The Vocational-Industrial Operational Curriculum

This is a plan for the training of selected students in occupations requiring a short period of training. The curriculum may include instruction in one or more operations which will enable the student to secure employment at the operational skill level; for example, drill press operator, milling machine operator, or lathe operator. This curriculum is intended primarily to serve the needs of pupils who intend to leave school before graduation from the twelfth grade. It is recommended that 80 per cent or more of the instructional time be devoted to activities



Practice in Machine Shop Set-Up

Erie School photo

designed to fit the learner for a specific job. The minimum entrance age shall be one year less than the age for employment in the occupations for which preparation is to be given. The learner must have expressed a possibility or intention of leaving school.

Plan E—The Vocational-Industrial Out-of-School Curriculum

This plan is intended for unemployed persons or persons about to be unemployed who need additional training in order to secure a job or transfer to another job. Instruction may include shop experiences varying from operational to technical. There may also be related subjects, and such courses as labor-management relationships, economics, English, and the like. Approved supervised correspondence instruction may be used for any part, excepting shop, of the Plan E curriculum. The minimum entrance age is 14, and applicants will have left regular full-time school, and must be unemployed or about to become unemployed. The instruction is terminated when the learner has been placed in full-time employment.

Plan F—The Vocational Cooperative Education Curriculum

This plan provides for part-time employment of student learners fo a part of the working day for alternating weeks or for limited perioc during the year. The employment of the students will take the place c school shop instruction. The related and general subjects instructio which together comprise 50 per cent of the total curriculum, must b given in the school. Students may transfer to this curriculum from Pla A, B, C, D, or E, or if not in one of the other vocational curriculums ma enter the Plan F curriculum at the beginning of the tenth grade. Th minimum entry age will be determined by existing State and Federal ac and regulations governing the employment of minors in educational pr grams, excepting where these conflict with the provisions of the vario vocational curriculums.

Learning Floriculture

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LAN G—THE VOCATIONAL PART-TIME EXTENSION CURRICULUM

Plan G is designed to provide instruction which will increase the skill r technical knowledge (or both) of employed persons. It has five conolling purposes:

1. Related training for apprentices.
2. Supplementary trade and/or related instruction for the upgrading of industrial workers.
3. Refresher instruction in trade and/or related subjects for industrial workers.
4. Trade and/or related instruction for industrial workers who are about to become employed.
5. Supervisory training for the upgrading of industrial supervisory personnel.

dult Education

Rapidly changing conditions in industry make it necessary for all ersons who are engaged in industrial pursuits to keep informed and epared to meet these new conditions. The responsibility for providing is instruction rests with the local director of Trade and Industrial Edution through the Superintendent and Board of Education.

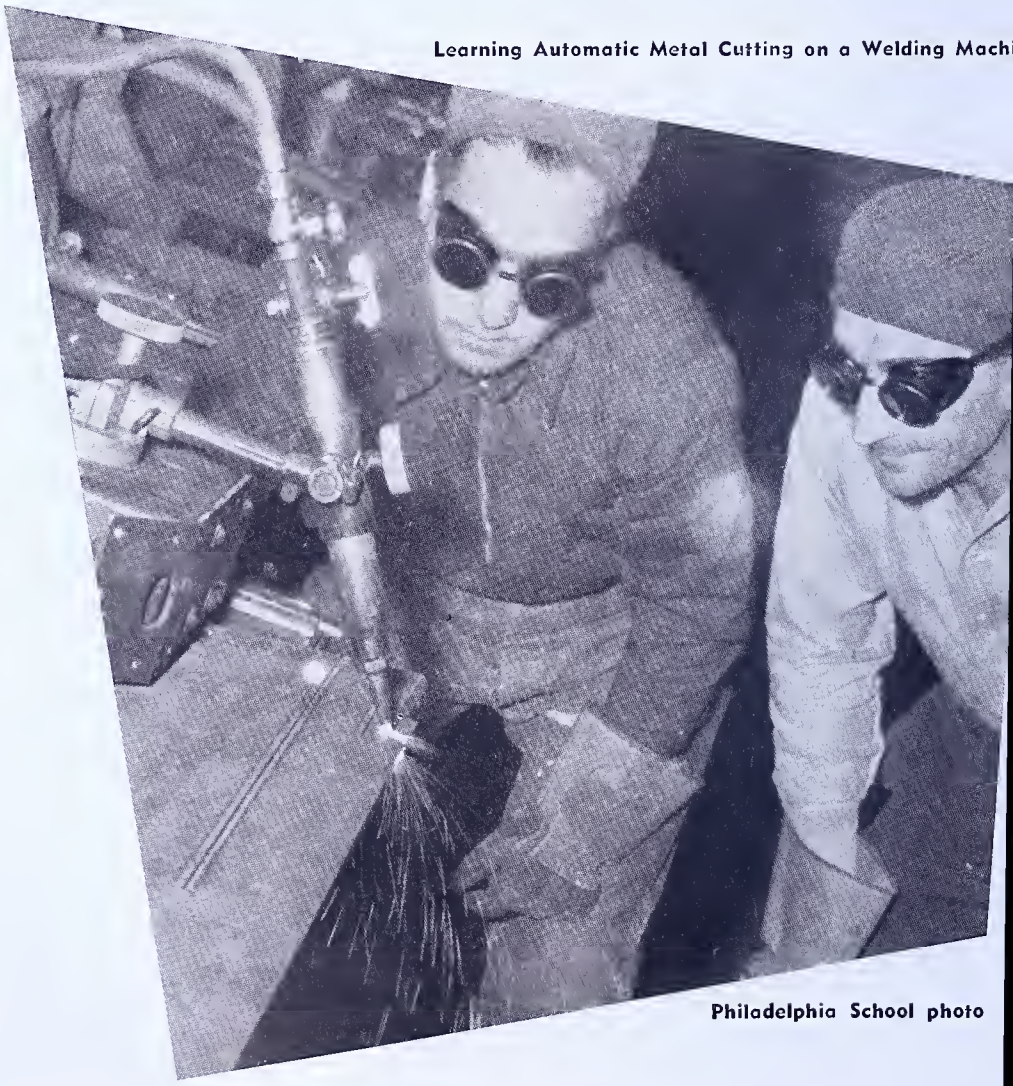
In order to carry out this responsibility, the director must work in ose cooperation with industrial and labor organizations to establish rograms to meet the needs of the service area. To aid in carrying out e responsibility of furnishing adequate provisions for adult part-time asses, the director is relieved of full-time teaching assignments, thus lowing time to establish and supervise such classes.

The importance of Adult Education in the community is further nphasized by the following:

1. Section II of the Smith-Hughes Act requires " . . . that at least 1/3 of the sum appropriated to any State for the salaries of teachers of trade, home economics, and industrial subjects shall, if expended, be applied to part-time schools or classes for workers over 14 years of age. . . ."
2. The Act also states that " . . . such subjects in a part-time school or class may mean any subject given to enlarge the civic or vocational intelligence of such workers over 14 and less than 18 years of age. . . ."
3. Further emphasis is made in Section 7 of the George-Barden Act which states that " . . . the provisions of Section II of the Smith-Hughes Act, requiring at least 1/3 of the sum appropriated to any

State be expended for part-time schools or classes, shall be held include any part-time day school classes for workers 16 years age and over . . ." and further that " . . . such moneys as are provide under authority of this Act for trade and industrial subjects, ar public and other service occupations, may be expended for par time classes operated for less than 144 hours per year. . . ."

Part-time classes are instituted primarily to provide instruction of a extension or supplemental type for the further development of pe formance skills, technical knowledge, related industrial informatio safety, and job judgment for journeymen and other industrial worke who need extension instruction in industrial, related, or supplement



Learning Automatic Metal Cutting on a Welding Machi

Philadelphia School photo

subjects. Part-time classes are also instituted for apprentices and other learners who need instruction in trade and industrial subjects; for out-of-school youth who need training and experience to fit them for useful employment; and for in-school youth and adults who have chosen an occupation and who need training for advancement in the trade or industrial pursuit.

Trade extension instruction is provided for employed workers for the purpose of increasing or extending their skill or knowledge in the trade or occupation in which they are or have been engaged. Other classes such as related instruction for apprentices, classes for workers in skilled or semiskilled and other occupations, and for employed public service workers, or any instruction designated to increase or extend the knowledge or skills of workers in trade and industrial pursuits or occupations, is considered trade extension. Another type of instruction is given to workers who have left full-time school for the purpose of fitting themselves for useful employment in trades, occupations, or fields of industry, other than those in which they are or have been employed. This trade preparatory instruction may be offered to a number of groups in different trade and industrial occupations but the instruction to be given to a particular group is confined to a single occupation after a change in employment. Such training may be followed by trade extension instruction.

In view of the importance of adult education and in order to adequately meet the needs of the service area, the vocational director will make provisions for adult part-time and trade extension industrial education. This educational program may provide the following evening or part-time courses:

1. Related subjects for apprentices
2. Supplementary trade program and/or related program for the upgrading of industrial workers
3. Refresher training (trade and related)
4. Part-time trade and/or related subjects program for unemployed and preproduction workers
5. Industrial supervisory training
6. Out-of-school youth (See Plan E)

Time Requirements

No minimum or maximum time requirements are set for the curriculum as a whole. In apprenticeship, the length of the program must be such as

PROGRAM	PURPOSE	CONTROL
1a. Industrial Arts for grades 7, 8, and 9	General education objectives; exploration of the world of work; handling of industrial materials; information about industrial life; development of desirable attitudes.	1a. Two hours a week for junior high school
b. Industrial Arts for grades 10, 11, and 12	General education objectives; preparation for leisure-time activities; concentrated shop courses for some of the "60 per cent" who do not go to college or prepare for the skilled trades.	b. Two to five hours a week elective for senior high school. Five to fifteen hours a week for concentrated shop courses and for the arts and crafts curriculum
2a. Plan A. Vocational Technical	Preparation for routine technical occupations.	2a. Vocational students transferred to Plan A for twelfth grade only; half- or full-time laboratory
b. Plan B. Unit Trade	Preparation for entrance into employment as an advanced apprentice.	b. Limited to list of approved occupations; half-time shop
c. Plan C. General Occupational	Preparation for several related occupations or individual student specialization for smaller communities unable to absorb graduates from unit trade classes.	c. Three-year program; half-time shop
d. Plan D. Operational	Preparation for occupations requiring not more than one year of training.	d. One-year program; full-time shop
e. Plan E. Out-of-School	Shop and/or related training for eventual unemployed youth or adults who have left regular day school.	e. Segregated classes; not limited to regular vocational related subjects; subjects must enhance employment possibilities; unemployed
f. Plan F. Cooperative	Shop training on-the-job for individuals transferred from any other school shop program.	f. School supervision for on-the-job training; standard wage for on-the-job time; half-time shop
g. Plan G. Part-Time Trade Extension	Increase of skill and/or technical knowledge of employed workers: (1) Related training for apprentices (2) Supplementary training for upgrading (3) Refresher training in former skills (4) Upgrading of employed workers (5) Supervisory training	g. Employed; related training; 144 hours per year for apprentices
3. Retraining	Training of unemployed for assured placement at the end of the course.	3. Certified placement; maximum course 150 hours; minimum hours a day, 6 hours

to fulfill the time requirements which have been established by the Pennsylvania State Council of Apprenticeship. The guiding principle is that the program should be such as to enable the learner to reach his educational objective within the shortest time.

No one school or system operates all the seven types of Vocational Industrial Education. The purpose of the sevenfold program is to provide an adequate variety of possibilities from which each system may select and re-select, in conformance with its existing and future needs in Vocational Industrial Education.

Shop Programs for the Public Schools of Pennsylvania

A ready-reference to all shop programs for the schools of Pennsylvania is shown in Figure 9, page 28 which indicates the type of shop program, purpose for which it is established, and the control or time allottment for the various types of shop programs.

Hand Needlework

Philadelphia School photo

III

Suggestions for Establishing and Promoting Vocational-Industrial Education

Learning Airplane Testing

Williamsport School photo

Administration

Directors of Vocational-Industrial Education

Procedure for Establishing Vocational-Industrial Education in Local Communities

Examples of Vocational-Industrial Schedules

Suggested Curriculums

The Survey

The Advisory Committee

Vocational Guidance

Counseling

Employment Possibilities

Placement Services

Follow-Up

Public Relations

Learning Tailoring

Philadelphia School photo

III

Suggestions for Establishing and Promoting Vocational-Industrial Education

THE PROVISIONS of the federal acts require that each State through its educational department submit a Plan for Vocational Education indicating conformity with existing legislation. This plan is prepared by the chiefs of the divisions of vocational education in cooperation with their respective staffs. After approval by the State Director of Vocational Education, Superintendent of Public Instruction, and the State Board for Vocational Education, it is submitted to the U. S. Office of Education for approval. This plan provides the basis for the use of federal funds by the State, and serves as an agreement between the Federal Government and the State in the development and maintenance of an effective program of vocational education.

Administration

The administration of Vocational-Industrial Education in the public schools of Pennsylvania is the responsibility of the local school district. To assist and advise the local districts, Department of Public Instruction staff members are located at the three teacher-training institutions to serve the public schools in the area of each institution. It is their additional responsibility to determine whether the local program of Vocational-Industrial Education meets the standards set forth in the Pennsylvania State Plan for Vocational Education in order to qualify for reimbursement. These state supervisors also have the responsibility of supervising industrial arts programs with particular emphasis on reclassification of school districts. A detailed description of the duties of the state supervisors is listed in the State Plan for Vocational-Industrial Education.

Directors of Vocational-Industrial Education

The efficient and successful operation of a vocational program is dependent upon the ability of the director. He must obtain the co-

operation and support of the leaders of industry, of the community, and of his fellow workers within the school district. The director should be recognized as a leader in the field of industrial training. The responsibilities of his position will require his active participation in community affairs, membership in service clubs, etc., in order that he may properly and effectively represent and interpret Vocational-Industrial Education to the public.

1. The administrative responsibilities of the Director of Vocational-Industrial Education shall be to:
   a. Develop the local philosophy of Vocational-Industrial Education in conformity with State and Federal policies
   b. Develop and carry out general administrative policies of the school in connection with Vocational-Industrial Education
   c. Interpret Vocational-Industrial Education to the community through an organized public relations program
   d. Maintain a continuous survey of the service area to determine the needs for Vocational-Industrial Education
   e. Develop, administer, and supervise Vocational-Industrial Education programs to meet the needs of the service area
   f. Plan and develop the facilities to carry out the training program
   g. Develop instructional material to fit the needs of the local industries
   h. Prepare or approve program schedules for the Vocational Department
   i. Administer the program so that it meets all requirements of State and Federal laws and policies
   j. Select, recommend, and organize the necessary administrative, supervisory, and instructional staff
   k. Develop and carry out a plan for the selection and counseling of students
   l. Develop and carry out a plan for the placement and follow-up of students and maintain records of all placements
   m. Organize advisory committees of individuals from organizations interested in industrial activities in connection with planning and operating a Vocational-Industrial Education program
   n. Seek advice and counsel from individuals, organizations, and agencies with the objective of improving the effectiveness of the Vocational-Industrial Education Program
   o. Assist and counsel industry in the establishment and conduct of training programs for specific training within industry
   p. Conduct training for industrial supervisors

q. Establish and conduct trade extension programs for employed persons
r. Represent the school district at meetings called by the Trade and Industrial Division of the Department of Public Instruction and at other meetings in connection with Vocational-Industrial Education
s. Serve at the request of the Department of Public Instruction on at least one committee per year for the evaluation of vocational programs
t. Assist non-reimbursable schools and classes having or working toward vocational objectives in their respective subject matter fields

Learning Carpentry and Cabinet Construction

Pittsburgh School photo

u. Maintain such records and submit such reports as requested by the Department of Public Instruction

v. Establish rules of safe conduct and regularly inspect all shop facilities to determine whether all equipment is in safe working order

w. Establish and conduct trade preparatory training programs for unemployed persons

x. Establish and conduct adult education classes

y. Establish and conduct technical and industrial education programs

z. Administer and supervise other programs of vocational or practical arts education in the district when so directed by the district superintendent

2. Supervisory responsibilities of the Director of Vocational-Industrial Education shall be:

   a. For the improvement of teachers in service. This is important for the all-day program teachers and especially for the part-time evening school teachers. Local Directors of Vocational-Industrial Education are directly responsible for the success of the local programs and for the efficiency of the trade, related, and other teachers under their supervision. The Director of Vocational-Industrial Education should carry on informal teacher training within his own school or department

   b. The supervision of the instruction in the subjects of the vocational program and other related subjects

3. Supervisory duties of the Director of Vocational-Industrial Education shall be:

   a. To induct new instructors into the program

   b. To prepare supervisory bulletins

   c. To provide for the improvement of the teaching staff by:

      (1) Observation and guidance in teaching methods and techniques

      (2) Teacher conferences

      (3) Curriculum construction

      (4) Arranging for teacher training instruction

      (5) Arranging for summer employment in industry

      (6) Arranging for industrial inspection trips for teachers

      (7) Arranging for attendance at professional meetings

      (8) Organizing professional meetings

   d. Rating of teachers

'rocedure for Establishing Vocational-Industrial Education in Local :ommunities

In establishing vocational-industrial education on the local level it is dvisable that extensive preliminary planning be done. A definite set of rocedures cannot be listed to meet every local situation; however, as a eneral guide, the following steps are recommended:

1. Verify the interest expressed in the community.
2. Enlist the support of school personnel.
3. Inform the local board of education and obtain approval for preliminary investigations.

Practice in Machine Grinding

Erie School photo

4. Secure advice and assistance of members of the staff of the State Board for Vocational Education.
5. Establish representative lay advisory committees.
6. Determine and verify need for training.
7. Determine occupations for which training should be offered, and develop tentative outlines of courses with the help of advisory committees.
8. Determine the available and needed training equipment and accessories.
9. Plan operating details of the school or department—admission requirements, class schedules, specific supplies, etc. Organize budget covering cost of equipment and teaching personnel.
10. Secure approval from local board of education and State Board for Vocational Education.
11. Provide for competent instructor and supervisory personnel.
12. Establish functioning supervision and put vocational program in operation.
13. Educate cooperating agencies concerning the aims and objectives of vocational education.
14. Establish a functioning placement and follow-up service.
15. Evaluate progress of the program periodically by consulting advisory committee, employers, and graduates.

Examples of Vocational-Industrial Schedules

The provisions of the State Plan for Vocational-Industrial Education provide opportunity for local administrators to plan a curriculum which will meet pupil needs as indicated by the local survey. Under these provisions, and in conformity with federal regulations, the local district is required to allot 50 per cent of the total training time to practical shopwork and the remaining 50 per cent of the time to be divided equally between related and academic instruction. In conformity with this requirement, school districts have elected to arrange schedules most applicable to their own conditions. Typical examples are indicated when pupils have been assigned:

1. One half-day in shop and the remaining half-day in related and general education subjects continuing throughout the entire year.
2. One complete school week in shop and the following school week in related and general education subjects continuing throughout the school year.

3. Two school weeks in shop and the following two weeks in related and general education subjects continuing throughout the school year.

Deviations from the above may be made; however, these are typical nd sufficient for illustrative purposes.

Under these schedule arrangements pupils may be assigned to provide or the best possible teaching situations. For example, juniors and seniors ay report to shop in the morning and sophomores report in the after-oon on the half-day schedule. When they are not in shop they are re-eiving related and general education instruction. Similarly, pupils may e scheduled on a week-about or a two-week-about schedule.

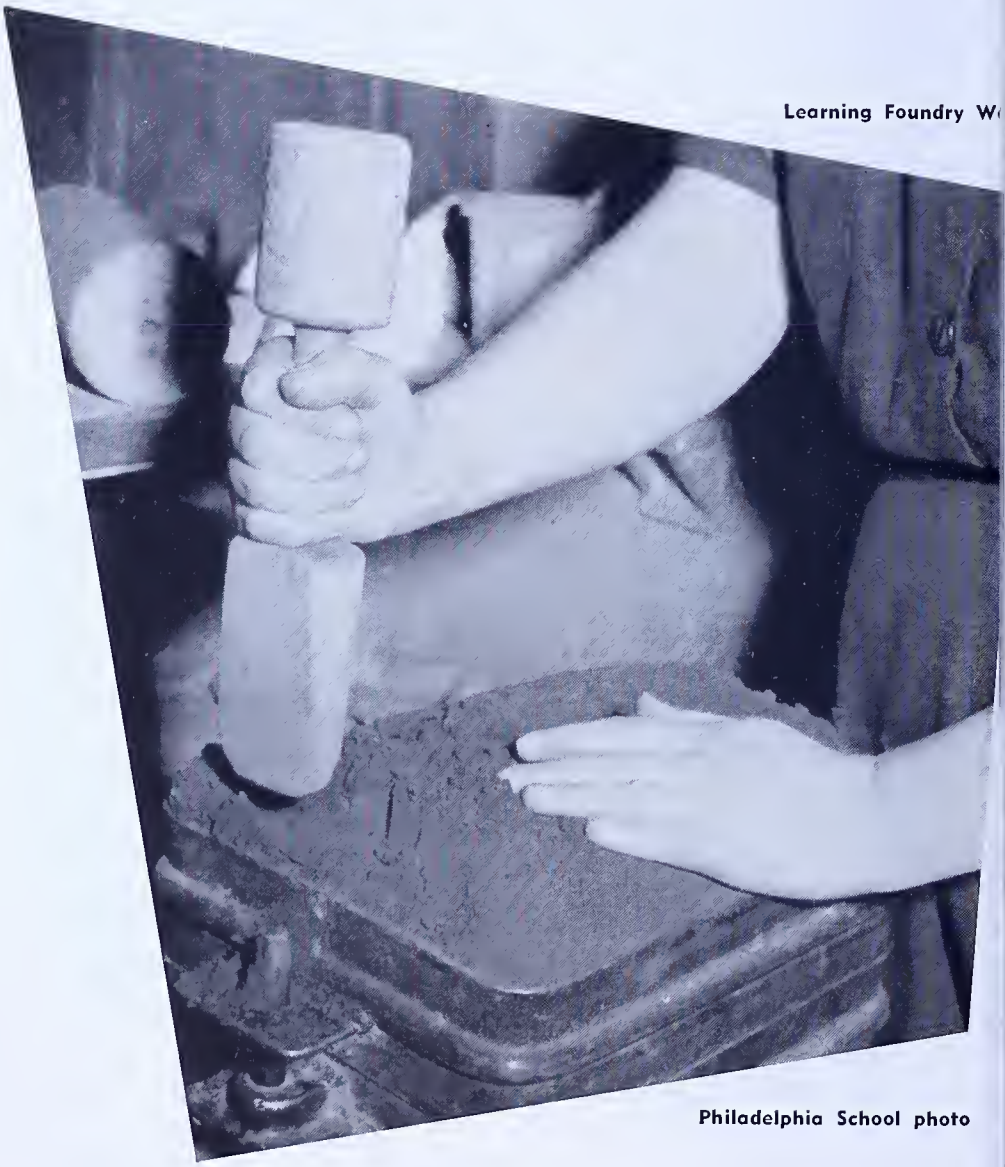
uggested Curriculums

Regardless of how pupils are scheduled, in order to meet high school raduation requirements actual time allotted to subjects must be consid-

Learning Manicuring

Pittsburgh School photo

ered and specific subjects, such as English, social studies, physical edu tion, must be included. All secondary school curriculums establish a ba group of courses to identify the curriculums and then allow considera freedom in the selection of electives. This is true of the College Prepa tory and General Commercial curriculums where three units are usua required and two may be elected. The Vocational-Industrial curricul requires the same units in general education, and in addition groups electives under shop and related subjects to meet rigid standards to sa



Learning Foundry W

Philadelphia School photo

ıard reimbursement. Consequently the Vocational-Industrial curriculum ore than meets the thirteen Carnegie units for graduation.

Figures 10 and 11 present curriculums for the alternating half-day, the rn-about-weekly, and the turn-about-biweekly curriculums. These are ggested plans and are indicated as guides rather than as mandatory rriculums.

FIGURE 10.—Suggested Curriculum, One-Half-Day Alternating Plan

	30 periods 60 min. each		35 periods 55 min. each		36 periods 50 min. each		40 periods 45 min. each	
	Per.	*Units*	*Per.*	*Units*	*Per.*	*Units*	*Per.*	*Units*
RADE 10								
op	15	2	17	2	18	2	20	2
glish	4	1	4	1	4	1	5	1
l. Math.	3	3/4	3	3/4	3	3/4	4	3/4
story	4	1	4	1	4	1	5	1
ys. Ed. and Health	2	1/3	3	1/3	3	1/3	3	1/3
l. Drafting	2	1/3	2	1/3	2	1/3	3	1/3
tivities[1]	0		2		2		0	
TOTALS	30		35		36		40	
RADE 11								
op	15	2	17	2	18	2	20	2
glish	4	1	4	1	4	1	5	1
l. Math.	3	3/4	3	3/4	3	3/4	4	3/4
l. Science	4	1	4	1	4	1	5	1
ys. Ed. and Health	2	1/3	3	1/3	3	1/3	3	1/3
l. Drafting	2	1/3	2	1/3	2	1/3	3	1/3
tivities[1]	0		2		2		0	
TOTALS	30		35		36		40	
RADE 12								
op	15	2	17	2	18	2	20	2
glish	3	3/4	3	3/4	3	3/4	4	3/4
l. Math.	3	3/4	3	3/4	3	3/4	4	3/4
l. Science	3	3/4	3	3/4	3	3/4	4	3/4
story	4	1	4	1	4	1	5	1
ys. Ed. and Health	2	1/3	3	1/3	3	1/3	3	1/3
tivities[1]	0		2		2		0	
TOTALS	30		35		36		40	

[1] Activities may be guidance, lunch period, assembly, etc.

FIGURE 11.—Suggested Curriculum, One- or Two-Week Alternating Plan

	30 periods 60 min. each		35 periods 55 min. each		36 periods 50 min. each		40 period 45 min. eac	
	Per.	*Units*	*Per.*	*Units*	*Per.*	*Units*	*Per.*	*Uni*
GRADE 10								
English	8	1	8	1	8	1	10	1
Rel. Math.	6	3/4	6	3/4	6	3/4	8	3/4
History	8	1	8	1	8	1	10	1
Phys. Ed. and Health	4	1/3	6	1/3	6	1/3	6	1/3
Rel. Drafting	4	1/3	4	1/3	5	1/3	6	1/3
Activities[1]	0		3		3		0	
TOTALS	30		35		36		40	
GRADE 11								
English	8	1	8	1	8	1	10	1
Rel. Math.	6	3/4	6	3/4	6	3/4	8	3/4
Rel. Science	8	1	8	1	8	1	10	1
Phys. Ed. and Health	4	1/3	6	1/3	6	1/3	6	1/3
Rel. Drafting	4	1/3	4	1/3	4	1/3	6	1/3
Activities[1]	0		3		4		0	
TOTALS	30		35		36		40	
GRADE 12								
English	6	3/4	6	3/4	6	3/4	8	3/4
Rel. Math.	6	3/4	6	3/4	6	3/4	8	3/4
Rel. Science	6	3/4	6	3/4	6	3/4	8	3/4
History	8	1	8	1	8	1	10	1
Phys. Ed. and Health	4	1/3	6	1/3	6	1/3	6	1/3
Activities[1]	0		3		4		0	
TOTALS	30		35		36		40	

NOTE: On week-alternating plan one full week in shop and one full week classroom with number of periods indicated above. On two-week ternating plan two full weeks in shop and two full weeks in classro with number of periods indicated above.

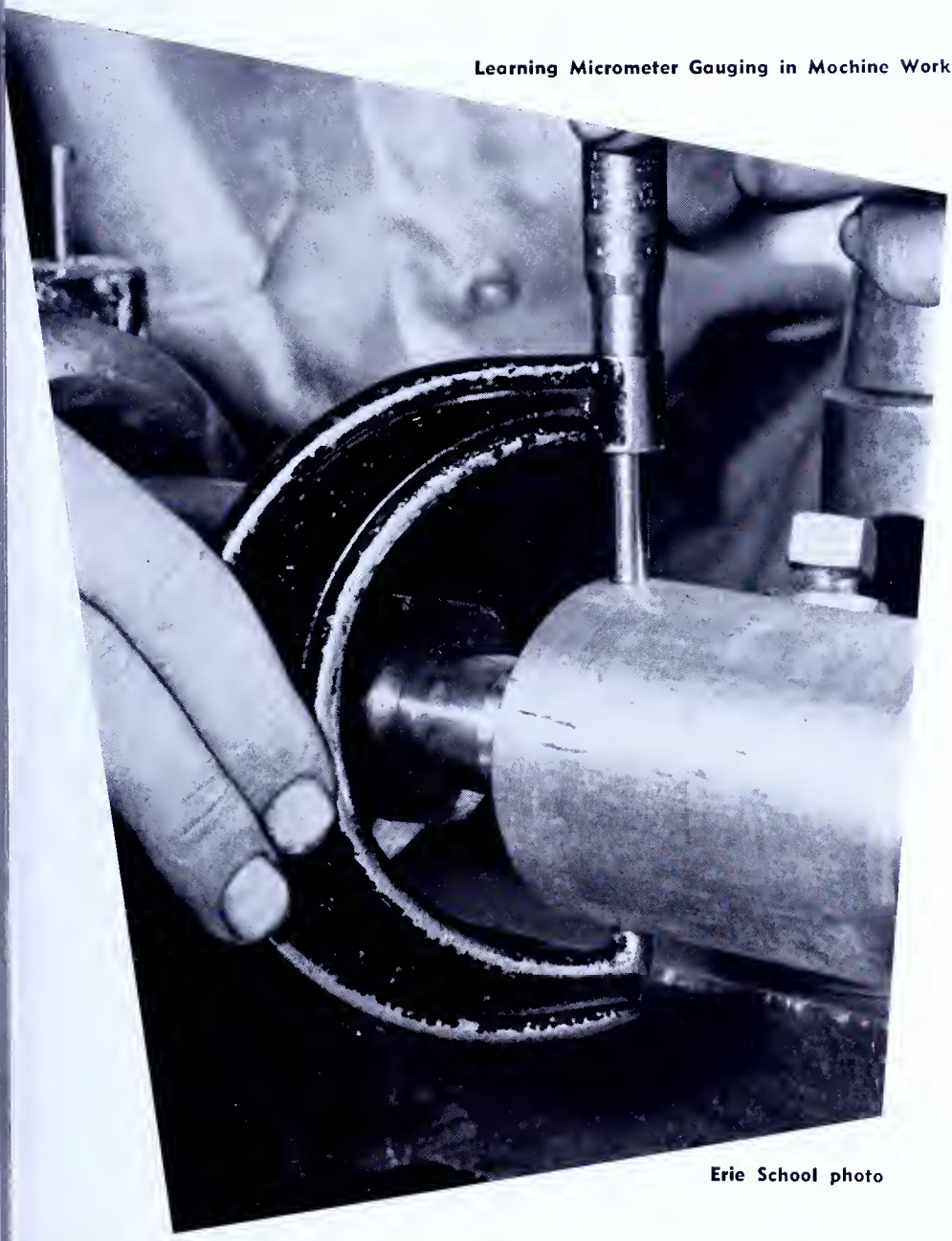
Carnegie Unit credit for shop work = 2 units.

The Survey

The preliminary procedure steps for establishing a program of Vo tional-Industrial Education (p. 37) require that a comprehensive stu be made to obtain the necessary information to justify including it

[1] Activities may be guidance, lunch period, assembly, etc.

Learning Micrometer Gauging in Mochine Work



Erie School photo

urricular offerings. This study is made through a survey of the com-
unity and the area surrounding the community and should include
nformation on:

1. Students enrolled in the secondary school to determine pupil interest in electing this type of program

2. Graduates of the school to determine what life activities they ha followed after completing their twelve years of formal education
3. Persons who have left school and what wage-earning life adjustme they made
4. Job opportunities in the service area for pupils who may pursue th program
5. Costs involved in establishing the program and whether the scho district can finance it
6. Attitudes of school board and administrative staff: Will they suppo the establishment and maintenance of the program?
7. School staff: Are they sympathetic to the program?

Practice in Sheet Metal Solder

Philadelphia School photo

8. Parents of children in school: Will they be interested in having their children enroll in the course and will adults be interested in retraining and upgrading if provided for in extension classes?
9. The attitude of employers: Will they cooperate in the development of the program?
10. The attitude of employe groups in the service area: Will they support the program?
11. Organized community groups: Are they willing to assist in establishing and supporting the program?

Surveys of this type have been conducted in Pennsylvania either by local school districts as a unit or by interested groups who have made studies for several school districts. Sample completed surveys are available from the Department of Public Instruction.

The Advisory Committee

The importance of having functioning advisory committees for vocational-industrial education cannot be emphasized too much. Not only can this committee of lay people from various occupations assist in the establishment of the program, but they can also serve in a continuing advisory capacity in the development and improvement of the program when it is in operation. Since Vocational-Industrial Education includes both the educating of persons for entrance into certain industrial occupations, and the upgrading of persons already employed in these activities, it is logical that industry and Vocational-Industrial Education should work cooperatively.

Vocational Advisory Council at Easton

The advisory committee tends to increase public interest and pub confidence if the people know that the program is well correlated a realistic, and that experienced and respected laymen are assisting in operation.

Advisory committees are of two types: the general advisory committ which is the continuing functioning group, and the craft advisory co mittee, which may function with the general advisory committee or particular phase of the program. School districts operating an approv vocational school department or classes should appoint a general advis committee and such craft advisory committees as may be necessary. T organization and continuing function of these committees is the resp sibility of the director of vocational-industrial education. The purpos advantages, organization, and functions of advisory committees are here presented for the information of local districts.

THE NATURE OF THE ADVISORY COMMITTEE

1. *Purpose*
   a. The purpose of the General Advisory Committee is to cons with the school authorities regarding the establishment a conduct of the Vocational-Education Program of the c munity
   b. The purpose of the Craft Advisory Committee is to cou with school authorities regarding the organization and c duct of Vocational-Industrial Education Programs for spe crafts and trades
2. *Advantages Gained by Use of Advisory Committees*
   a. *Advantages to employers*
      (1) Offers employers the opportunity to secure the trai desired for workers
      (2) Permits employers to participate in the developmen potential employes
      (3) Reduces the training costs
      (4) Provides employes with a better understanding of ployer-employe relations
   b. *Advantages to labor*
      (1) Provides labor with a voice in the development of ent and future workers
      (2) Increases possibility of obtaining a "job-fitted" empl
      (3) Provides a better understanding of the aims and o tives of Vocational Trade and Industrial Education

c. *Advantages to the school*
   (1) Problems can be better solved and many misunderstandings eliminated through the cooperative efforts of labor and management
   (2) Employment possibilities for students in local trades and industries are made easier
   (3) Program will become sounder through the guidance of the committee
   (4) Additional assistance can be obtained when local school requires community support

d. *Advantages to the student*
   (1) Assures the student of standards acceptable to industry
   (2) Affords direct contact with industrial people
   (3) Assures student of employer and labor interest
   (4) Assures extension classes after graduation

3. *Organization of the General Advisory Committee*

a. Local general advisory committees should be composed of an equal number of employers and employes from the service area of the school district. The members of labor and management should constitute the official membership of the committee.

b. Representatives of the Trade and Industrial Division of the Department of Public Instruction, the Department of Public Assistance, and of the Pennsylvania State Employment Service should serve only as consultants.

c. The committee should be limited in size so that it can be an effective working group. Normally a committee of between four and eight members has been found to be most successful.

d. Representatives should be nominated by established employer and employe organizations and appointed by the local school board. In selecting members it is suggested that

   (1) A request be made to the various employer associations to nominate a definite number of representatives from industries located in the community to serve as possible members. Information concerning employer associations may be secured by contacting local Chambers of Commerce.

   (2) A request be made to the various labor organizations to nominate a definite number of members to serve as representatives. From this list of nominees the number selected should be equal to the number nominated from the employer representation. Information can be secured from the Pennsylvania Federation of Labor to determine labor organizations represented in the community.

(3) A request be made to the various State and Feder agencies to name persons as consultants.

e. The committee should be organized with the election of chairman from either the employer or employe members. It suggested that the term of office be limited to one year, a the chairmanship alternate between the two groups.

It will be the duty of the chairman to

(1) Call meetings to order

(2) Present matters of business as submitted by the secreta

(3) Direct and bring to a final conclusion discussion on matters brought before the committee

f. The committee secretary should be selected at the first meetin and it is recommended that the position be held by the loc director of vocational-industrial education. It will be t duty of the committee secretary to

(1) Prepare written agenda for each meeting

(2) Mail agenda and other information to committee me bers at least five days prior to the date of the meeting

(3) Prepare minutes of each meeting and distribute su minutes to each member of the committee. Copies of t minutes should also be placed in the files of the sup intendent of schools and the director of vocation industrial education, and should be made available to t Department of Public Instruction upon request. Me ings should be held at least quarterly

(4) Carry on necessary correspondence

g. The General Advisory Committee may constitute itself as o or more Craft Committees or it may appoint Craft Committe Craft Committees are necessary so that craft or occupatio groups may have a voice in the planning and conducting specific areas of instruction, as well as enable school autho ities to secure information which can be obtained only fr such craft or occupational groups.

h. Each Advisory Committee shall determine

(1) The tenure of each member

(2) Procedures for conducting meetings

(3) Special committees

(4) Other details pertaining to the operation of the co mittee

4. *Functions of the General Advisory Committee*

The primary function of the committee is that of counseli and advising the school authorities in matters pertient to t

Vocational-Industrial Education program as a whole. These matters may pertain to

Public relations
Selection of instructors
Instructional material
Selection of equipment
Location of schools
Placement of students
Cooperative education
In-plant training
Trade extension education
Publicity
Production work
Organization of craft committees
Surveys and establishment of new curriculums
Selection of students
Donation of funds, equipment, and supplies for the operation of Vocational-Industrial Education
Vocational guidance

/ocational Guidance

The program of Vocational-Industrial Education cannot be established nd cannot be an efficient, functioning program without a comprehensive rogram of guidance to direct students toward the aims and objectives f this type of education. The broader aspects of guidance would indicate

Vocotionol Counseling

Bethlehem School photo

that it is a procedure directed toward helping individuals to plan own actions wisely in full light of all the facts that can be collected a themselves and about the world in which they live. In this respect g ance should be a never-ending process throughout the school life o individual. Vocational Guidance becomes most effective in the ju high school where students have an opportunity to gain an appreci of the vocations and to explore industrial occupations through a participation in school shops. Therefore in establishing a progra Vocational-Industrial Education it is essential that the local school di have a well-developed program of Industrial Arts activities in grad 8, and 9. Vocational guidance becomes an integral part of the pro of Vocational-Industrial Education through

1. Selection of students who may enter industrial courses
2. Maintenance of pupil personal inventory
3. Counseling of pupils
4. Study of job opportunities in the area
5. Study of placement opportunities
6. Development of a system of follow-up after the student is p on the job.

The Director of Vocational Education has the responsibility of dev ing a guidance program for his department or school. In so doin must extend his efforts into the junior high school and assist those tea or guidance counselors by supplying information to be used at that In order to give the teachers and students an insight into the indu vocations the following activities are recommended: the showing of talks by vocational students, teachers and director, and visits to the tional shops. Frequently career conferences are held. These pr opportunity for pupils to indicate their future life activity interests to hear speakers who are specialists or who have years of experien the vocation.

If pupils have been supplied with all the information necessary for ing a choice of some life activity during the junior high school period may then make a tentative selection of an occupation preparatory to ing the senior high school. This indication by the pupil is not suff reason to enter him in the course which will prepare him for the ac he has chosen. He may not have considered all factors which ha influence on his success in the occupation. Therefore a plan fo

lection of pupils to enter vocational-industrial courses should be de-
loped by the local district. Advancement in the science of testing and
idance makes it possible to screen carefully all applicants for admission
vocational-industrial courses. All available information should be
tained concerning the pupils in conformity with occupational require-
ents. In general, a plan for the selection of pupils for vocational-in-
strial courses should determine:

Leorning Upholstering

Philadelphio School photo

1. Mental ability
2. Aptitudes
3. Special abilities
4. Motor skills
5. Personality traits
6. Interests
7. Physical characteristics
8. Past educational experi or achievement
9. Attendance
10. Other pertinent pers data

Considering that the pupil has made a selection of a vocational in trial course, and that test results administered through the selection gram indicate he is fitted to enter the course, approval to enroll shoul obtained from the parents of the pupil. This program of selection not preclude further screening of pupils during their training perio

It is essential that a student record of the findings through sele testing and other pertinent data be maintained for individual pu The cumulative record is an excellent means by which to observe strengths, weaknesses, and rate of development of the pupils.

Counseling

Personal discussions with pupils as they progress through their t ing, are an essential part of any guidance program. During this pe the pupil is developing skills, technical knowledge, and citizenship q ties, and he needs direction from experienced personnel. The pr conference offers this opportunity and tends to bridge the gap bet teacher and pupil. Record of these conferences should appear in pupil's personal file.

Employment Possibilities

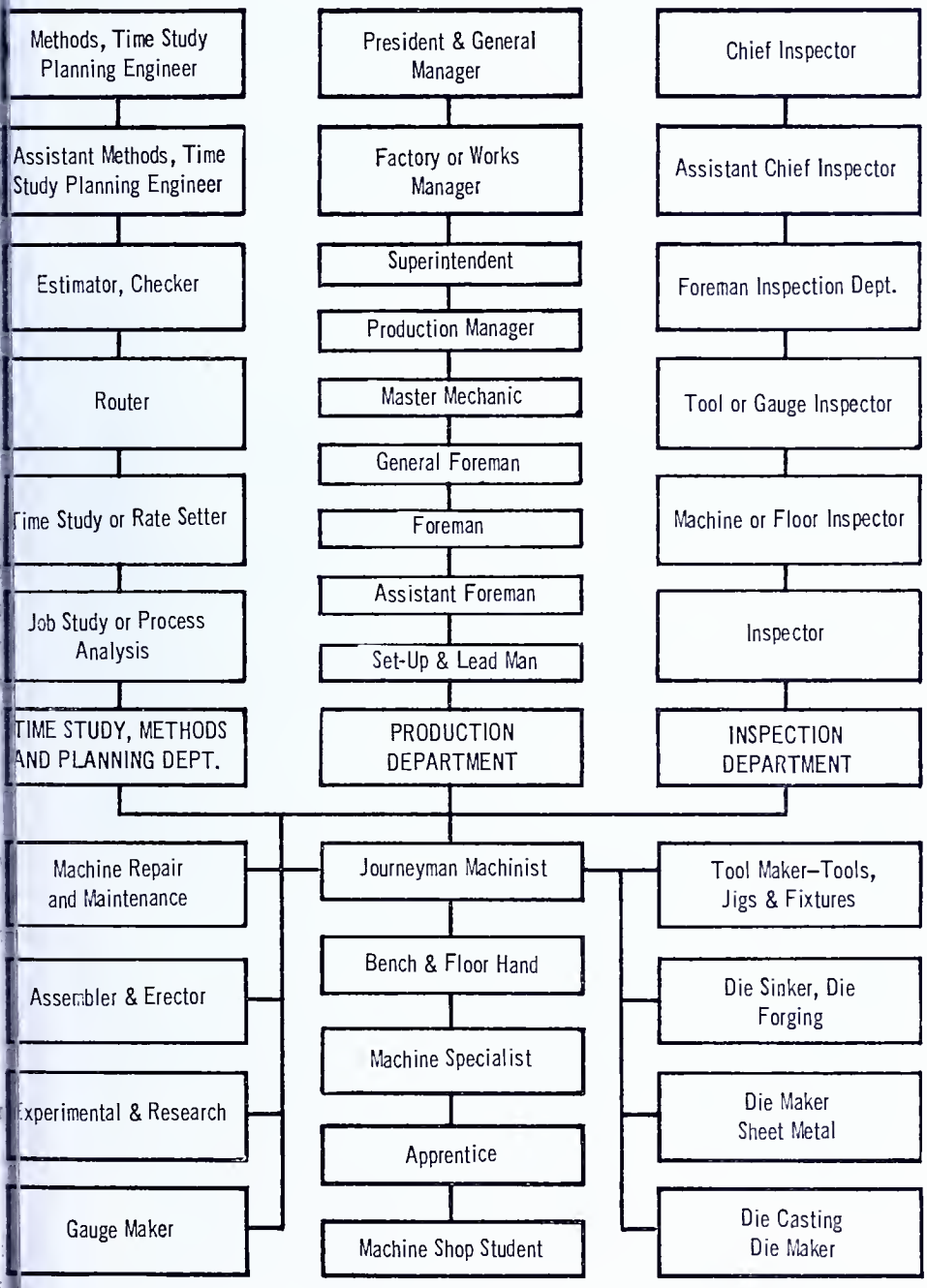
The guidance program should include an analysis of jobs in the pational area in terms which indicate the characteristics of the work the employment possibilities after graduation. An analysis of oc tions might include:

- Background of information relative to the occupation
- Social significance
- Qualifications
- Methods of entry
- Preparation
- Advancement
- Hours
- Regularity of employment
- Health and safety hazards
- Labor—organized or uno ized
- Places of employment
- Supplementary data

Through a study of the occupations, guidance tools, such as are trated, can be developed. Figure 12 indicates the job possibilities advancement in the machine industries.

FIGURE 12.

OB POSSIBILITIES & ADVANCEMENT IN THE MACHINE INDUSTRIES



Placement Services

Placement of graduating pupils on jobs for which they are qua is an important function of the director. Probably the most eff method of placing graduates is through personal contact with empl in the area served by the school. Periodic visits by the vocational di or his representative to industries on follow-up of employed grad and for other reasons would provide this opportunity for personal tact with labor and management. The advisory committee also pla important part in the placement of graduates.

Prior to graduation the vocational director should indicate to pective employers in writing, qualifications of the graduating p These qualifications can be most clearly expressed by developing a which would include:

1. Name of pupil
2. Home address of pupil
3. Course he pursued
4. Time spent on each practical course unit
5. Degree of attainment in the skills
6. An indication of his achievements while in school
7. Attendance record
8. Citizenship qualities
9. Remarks or comments

It is pertinent that all descriptive reports of this type should be fol by personal visits to the industry to provide any further informati employer may need.

Follow-Up

The responsibility to pupils does not terminate with graduation transition from the twelve years of formal schooling to earning a hood in industry will be an adjustment period for youth. Frequent to industries where graduates have been placed will offer opportun learn from the employer how well the graduate is progressing and difficulties are being encountered in employment. Conversation wi graduate on the job may reveal other problems which the voca director may assist in solving. Counseling and action on proble rived from these sources will tend to create a better worker and quently reflect credit on the vocational-industrial program.

This follow-up of graduates becomes increasingly difficult in p tion to the number of graduating pupils; however, it is the most factory method of adjusting the new worker to the job. In addit

erving the graduate during the early stages of employment, a follow-up stem should provide for complete records covering a period of years f employment. Records of this kind should show:

1. Changes in residence
2. Changes in employment location or status
3. Type of work performed while in employment
4. Duration of employment at each location
5. Dates of visits to industry
6. Results of conferences
7. Other pertinent information

Learning Practical Nursing

Pittsburgh School photo

A system of follow-up can enrich the curriculum content and prov information promoting the program to the pupils, to the commun and to industry. Studies can be made from the accumulation of d relative to graduates which would show:

1. Success of graduates
2. Wages
3. Degree to which vocational-industrial training carries over into life activities
4. Extent to which former pupils are engaged in the occupation for which they were trained
5. Occupational conditi which have hindered pr ress
6. Extent to which gradua needed further training
7. Ways in which the sch has failed to meet edu tional or vocational need

Usually a combination of several methods is used to obtain the ne sary information. Methods found to be effective include

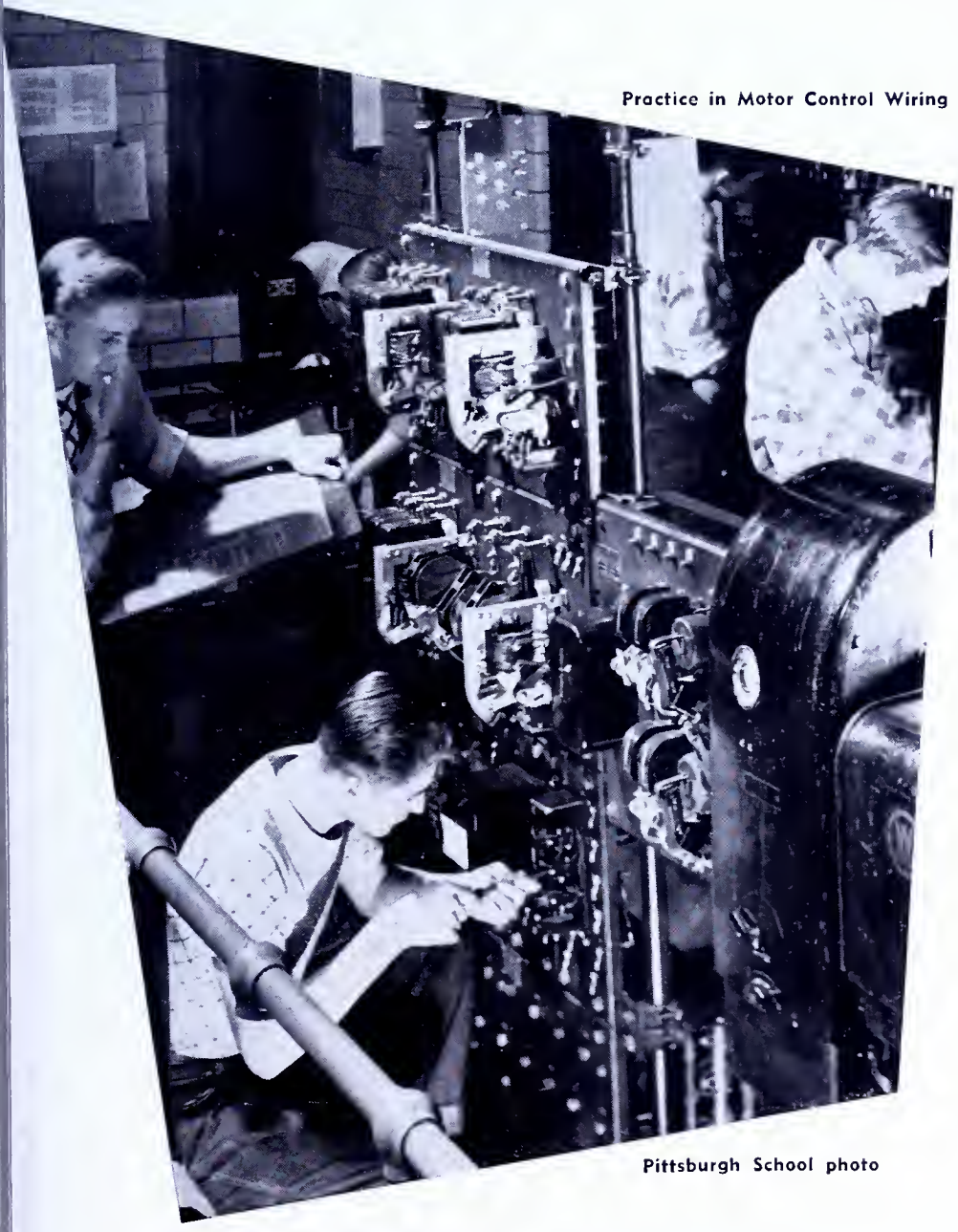
1. Information concerning the graduate gained through conversat with friends who may still be in school
2. Annual alumni meetings
3. The use of birthday cards requesting the graduate to return formation on a form inclosed with the card
4. Personal contact on the job

Public Relations

A program of Vocational-Industrial Education needs the coopera of individuals and groups of individuals, not only when it is establis but also while it functions as a part of the total education program. dence of this was indicated earlier in this chapter under Procedure Establishing a Program of Vocational-Industrial Education. Interes the program, if it is to be effective, should be maintained and continu developed by the director. Basically, the program is recognized to extent that it has well-qualified instructors and administration, and g shop facilities with adequate equipment. Further, the program is re nized favorably if the curriculum is designed to meet the needs of pu and the graduates are accepted by industry as being competent in activity for which they have been trained. Although the vocati director is primarily responsible for building confidence and gai respect for the program, the teachers, advisory committee, school ad istrative staff, and the school board have a share of this responsibi

The program of public relations should be developed to serve employer nd employe groups, community groups, citizens of the community, ducators in general, the school board, and the pupils.

Various methods may be recommended in developing a program of ublic relations, some of which follow:



Practice in Motor Control Wiring

Pittsburgh School photo

1. Serving industry by providing qualified personnel. This requires a sound, basic all-day program for youth and a comprehensive adult program.
2. Development and circulation of descriptive pamphlets, newspaper releases, and preparation of and participation in radio scripts.
3. Public addresses by the director of vocational education or members of the advisory committee to community groups, such as civic clubs, employer and employe associations, and Parent-Teacher groups.
4. Open house at least once a year offers opportunity for the public to visit the school to observe facilities and equipment, and to gain an insight into the curriculum content.
5. Exhibits publicly displayed in the school and in public places provide opportunity to display abilities of pupils in completing various projects.
6. Assembly programs in the school sponsored by the vocational department tend to inform students and teachers of the work.
7. Visits to school shops by student groups, particularly junior high school students, provide exploratory opportunities.
8. Personal contact by the vocational director with employers, employe organizations, leaders, and others.
9. Follow-up on graduates produces good will and further appreciation of the program.
10. Annual reports to the superintendent and board of education provide an overview of accomplishments.

These activities are evidence of a well-planned program of public relations. A public relations program of this type not only promotes the program of industrial education, but in a broader sense promotes the total education program of the local community.

IV

Shop Instruction in Vocational-Industrial Education

Proctice in Geor Cutting

Pittsburgh School photo

Teachers of Vocational-Industrial Education
Desirable Qualifications of Shop Teachers
The Course of Study
Methods of Instruction
Standards and Measurements of Attainment
Evaluative Criteria for Day School Shop Instruction
Shop Organization
The Shop Toolroom
Plant and Equipment
Emphasis on Citizenship

Practice in Bricklayin

Pittsburgh School photo

IV

Shop Instruction

IN CONSIDERATION of the many different occupations for which instruction is provided in Vocational-Industrial Education throughout the State, this section can be devoted only to basic information common to all shop instruction. It is intended, therefore, that specific trade content bulletins be prepared supplemental to this publication.

The content of this section has been developed in conformity with the following objectives:

1. To train a person for useful employment in a trade
2. To develop desirable social and character traits that will result in satisfactory social, civic, and personal living

Therefore the first part of this section considers shop practices while the last division refers to the second objective, that of developing good citizenship qualities.

Teachers of Vocational-Industrial Education

When assigned by the director or the school administrator, the duties and responsibilities of the vocational-industrial education teacher will include:

1. The instructing of vocational-industrial education classes
2. Aiding the director in determining the needs of local industry
3. Aiding the development of training programs to meet the needs
4. Assisting the director in the placement of students
5. Counseling and advising students and prospective students on matters pertaining to the teacher's field of activity
6. Assisting in the establishment of criteria to be used in a plan for the selection of students in the teacher's occupation
7. Developing of individual instructional material
8. Assembling of material for use by the guidance counselors
9. Selecting of tools and equipment
10. Developing of trade analyses
11. Participating in professional meetings, the purposes of which are improvement of instruction and the development of the curriculum
12. Serving on committees for the improvement of Vocational-Industrial Education.

The duties and responsibilities of a vocational-industrial teacher do not free him from other duties and responsibilities common to all teachers, such as securing proper certification, making out reports, reading the Bible, roll call, etc. The vocational-industrial teacher has an obligation and an opportunity to develop, in addition to the occupational skill and knowledge of the students, a proper attitude, good character, and a sense of civic and social responsibility. The vocational-industrial teacher, more than anyone else, can discover before the student's entrance into industry, those desirable and undesirable personal traits with which industry is so vitally concerned.

Desirable Qualifications of Shop Teachers

In the performance of his job the shop teacher has an unusual opportunity to develop in pupils those qualities which are not only desirable in production, but also to develop those social and civic traits which all individuals need for successful living. The opportunity presents itself because the shop teacher has the pupils over a longer period of time than any other teacher, and therefore has a better chance to observe their weaknesses and correct them.

Comprehensive qualifications of the shop teacher are:

1. That he possess sufficient mastery of the trade he is teaching
2. That he be able to teach the content effectively
3. That he have the ability to develop in pupils desirable qualities of citizenship.

These general qualities include personal, professional, and technical qualities:

Personal Qualifications of the Teacher:

1. Health and vigor
2. Enthusiasm, sympathy, cheerfulness
3. Bearing and carriage: poise; self-possession
4. Voice: pleasing to hear, distinct enunciation, carrying power
5. Positive habits as revealed by the history of previous employment—
   Industry: steady application to work
   Punctuality and promptness
   Initiative

Academic, Professional, and Technical Qualifications:

1. Satisfactory general scholarship
   No special reference is made to degrees held.

2. Mastery of the trade as indicated by:
   a. Opinions of fellow craftsmen and employers
   b. History of trade experience
   c. Use of the language of the trade
   d. Artistry in the manipulation of the tools, materials, and machinery of the trade

Practice in Sewing Machine Operation

Pittsburgh School photo

Professional Interest and Growth indicated by

1. Membership and participation in his craft organizations
2. Membership and participation in educational organizations
3. Membership and participation in social and civic organizations
4. Familiarity with trade and industrial literature
5. Preparation for and/or improvement in teaching shopwork throu organized study to develop:
   a. Ability to analyze a trade to discover its teachable elements
   b. Ability in the organization of the content of a trade as covered by an analysis of the trade into an effective course study
   c. Ability to organize effective shop instruction materials
   d. Skills and understandings in methods of instruction, as termined by the psychology of learning, and by the nature needs of vocational pupils
6. Cognizance of the social and economic problems of the vocation
7. Contacts with industry as a means of:
   a. Facilitating the entrance of students into employment
   b. Keeping abreast of new developments in the industry

The Course of Study

The counsel of representatives of the craft and the employers sho be obtained when a course of study is to be organized for a specific tr The purpose of such a committee is to bring to the school shop a kno edge of the needs of the pupil in terms of the requirements in indus Subsequent periodic reviews of the course of study by the committee recommended as a means of keeping it up to date.

It should be understood, however, that the function of such a c mittee is to give advice and counsel, and not to initiate or execute ed tional policies.

Course Content

In order to bring about the consummation of the objectives of s work, it is necessary to plan for specific developments in the learner will enable him to work successfully at his trade. To this end, the s work must provide experiences arranged in proper teaching sequenc well as repetitive training leading to the development of trade skills the understanding of trade processes.

A typical shop course should be built around typical trade jobs and xperiences that have very definite objectives and which provide for

1. The development of skillful manipulation of tools, equipment, and materials
2. The ability to analyze trade problems and to make plans for their solution
3. Learning the customary procedures and work methods employed by industry and by workers in the trade
4. The development of respect for the value and importance of the work and the appreciation of skillful trade performance
5. Repetitive training for the development of greater accuracy, neatness, and speed in the performance of trade operations
6. Learning to cooperate with fellow workers engaged in group projects
7. The development of leadership through participation in the management of the shop and the supervision of group trade projects

Shop-course content should be based upon the elements of the trade as evealed by an analysis of that trade. The skills to be developed and the cts to be learned thus determined, should be arranged according to arning difficulty for most effective teaching.

Such analysis and subsequent course organization should be done by ie instructor with the cooperation of the advisory committee and the ssistance of vocational directors, supervisors, the Department of Public nstruction, vocational teacher-training institutions, and other persons nd agencies familiar with the techniques of trade analysis and course-lanning.

As a final check, the course of study should be examined to determine ow well it satisfies the requirements of the occupations as set forth by ie industry, prospective employers, labor groups, and specialists in the eld. Such review should provide answers to three important questons:

1. Does this check reveal a course of study that outlines specifically the elements to be taught?
2. Is it based upon definite objectives?
3. Does it contribute definitely to the over-all training of the student?

etailed Steps in Preparing a Course of Study

1. Make a list of the operations a worker in the trade must perform.
2. Select typical trade jobs as vehicles for giving instructions in trade skills and trade information.

3. Arrange the material in good teaching sequence.
4. Develop checking standards for each unit (time limit, quality of finish, tolerances, etc.).
5. Develop teaching material to supplement the work of the instructor and to provide for individual instruction.
6. Prepare tests to measure specific skills, trade information, and general progress in the trade.
7. Prepare charts on which to record student progress.

Requirements of Shop Jobs

1. They are typical of the trade.
2. They provide experiences in the basic operations of the trade.
3. They are arranged in good teaching sequence.
4. They have adequate variety to provide training in all the trade skills.
5. They are selected to provide repetitive training in trade skills.
6. Certain jobs are selected specifically to develop cooperation and to teach trade procedures and methods in trades in which workers commonly work together in groups.
7. Selection of jobs suitable to teach safe trade practice.

Auxiliary Information

Every vocational-industrial pupil acquires a body of factual information regarding trade terminology, safety practices, materials recognition and identification, sequential operations and similar learnings now grouped under an *identification title of auxiliary information.* The term "trade theory" was commonly used to identify this grouping in years past and a classroom course so labeled was taught within the related subject grouping. Present-day practice has restricted the content to essential elements and transferred the instruction from the classroom to the shop where the instructor follows his outline of auxiliary information in shop talks and group discussions.

Course content of auxiliary information will vary depending upon the importance of items with respect to various trades. Generally, such topics as trade terms, knowledge of machinery, tools, equipment, products safety, hygiene, trade analyses, special methods, shop organization, shop management, history and development of the trade should be included. Since the content is very closely allied to the practical instruction offered in the shop, the instruction should be provided by the shop instructor or an instructor who is familiar with all aspects of the particular trade practice.

General information might include content that is desirable for the student to know, but is not always necessary in order that he may become proficient in his work. This information may include history of the trade or occupation, economic and social values, sources and types of raw materials, methods of manufacture, production of materials, relationship to other occupations, etc. Guidance information is mentioned only as a method of providing the student with an understanding of employe-employer relations and as information regarding available work facilities.

The following information may be considered a brief outline of subject matter for auxiliary information. However, it is intended to represent a general example and as such is not completely applicable to all trades. It serves only as an indication of what might be included in a related auxiliary information course. The topics will vary in importance depending on the requirements of the different trades.

AUXILIARY INFORMATION SUBJECT MATTER

1. *To Teach Processes and Methods*

   To teach processes and methods not represented by tools and equipment in the school shop.

2. *To Teach Trade Terminology*

3. *To Teach Shop Safety*
   a. Danger points of all machines and tools in their use and operation
   b. Protection against injury (mechanical safeguards provided, personal precautions to be observed)
   c. Fire hazards
   d. First aid
   e. Occupational diseases
   f. Insurance, compensation
   g. Legal aspects of accidents
   h. General health factors (ventilation, sanitation, lighting, recreation, personal habits)

4. *To Teach Shop Organization and Management*
   a. Personnel problems
   b. Working hours
   c. Time-keeping systems
   d. Rates of pay
   e. Unions, union policies
   f. Company, company policies

Refining the Course of Study

The following charts, Figures 13 and 14, suggest a method for judging a series of potential shop jobs to determine:

1. Suitability for providing training in all the basic operations

CHECK CHART

Lesson	TRADE	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6	Operation 7	Operation 8	Operation 9	Etc.
1.	Job A	√	√	√	√	√					
2.	Job B				√	√	√	√	√	√	
3.	Job C					√	√	√	√	√	
4.	Job D	√	√	√	√						
5.	Job E		√	√	√	√	√				
6.	Job F			√	√	√	√	√	√		
7.	Etc.										
8.											
9.											
10.											
11.											
12.											
13.											
14.											
15.											

Skills or operations arranged in good teaching sequence, and typical trade teaching jobs analyzed for their operations.

FIGURE 13.

2. Provision for repetitive practice in developing trade skills
3. Proper emphasis upon the elements of the trade, based upon their relative importance in the trade
4. Good teaching sequence

CHECK CHART

Lesson	TRADE	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6	Operation 7	Operation 8	Operation 9	Etc.
1.	Job D	√	√	√	√						
2.	Job A	√	√	√	√	√					
3.	Job E		√	√	√	√	√				
4.	Job F			√	√	√	√	√	√		
5.	Job B				√	√	√	√	√	√	
6.	Job C				√	√	√	√	√	√	
7.	Etc.										
8.											
9.											
10.											
11.											
12.											
13.											
14.											
15.											

)bs arranged to provide a more logical teaching sequence of the perations involved and to permit continuity of repetitive training.

FIGURE 14.

Methods of Instruction

The Job as the Instrument of Instruction

The basis for teaching shop work is the job. It is the vehicle for g instruction in the development of trade skills. Operations perform exercises apart from real trade jobs, have little meaning for the lea It is the job that makes the operation useful and interesting to However, this does not mean that skills should never be practic isolated exercises. A certain amount of such practice work is ofte visable in order that costly material may not be wasted, particula the early stage of development of a new skill.

While the job should, in general, be the means by which to teach emphasis should not be on the job itself, but on the skills it inclu

Developing Skills

The shop teacher is concerned chiefly with the development of m skills involving the use of fingers and hands in the manipulati hand tools, machines, and materials. In giving instruction, he s bear in mind certain facts that influence the development of such

1. *The importance of the first impression*

   If the learner is to "get off on the right foot" the teacher' instruction must be to the point, accurate, and clear. The fir pression is a permanent one.

2. *Immediate practice*

   The pupil should be permitted to put into practice what has presented in the lesson as quickly as possible. Much of the effe ness of a lesson is lost by putting it into "cold storage" until later time.

3. *Correct initial practice*

   The learner should be made to practice a new skill correct first time. Here, too, the first impression is permanent. Inc practice here is likely to develop into bad habits which are cult to correct.

4. *Skill developed through practice*

   The more frequently a learner practices a certain moveme manipulation, the more skillful he becomes. It is importan the skill be practiced in exactly the same way each time repeated.

eaching Steps

1. *Preparation.* Gain the students' attention and arouse their interest. Lead them to the point where they are ready for instruction. Make them *want* to learn. Let them know the objectives of the lesson.
2. *Presentation.* Present the lesson. Tell, show, and emphasize the key points. In this step the teacher shows and explains how a new skill should be performed.
3. *Application.* This should follow presentation of the lesson as quickly as possible. Instruction, given in the presentation step, if allowed to cool off, will lose much of its effectiveness. In this part of the lesson the student puts into practice what has been taught in the presentation step. In case of the demonstration method he performs the same manipulations demonstrated by the instructor.
4. *Testing.* The application step calls for close supervision by the instructor to insure that the student practices the skill correctly, and thus develops proper work habits. The instructor checks the work frequently while it is being done to determine correct procedure, manipulation of tools, machines, and materials. He checks it again when it is finished to determine its quality and the amount of time required for its completion.

In a well-administered lesson these elements reappear in whatever rder and with whatever frequency may be necessary for effective learning. or example, throughout the application or practice part of the lesson, he students may indicate the need for and receive further instruction presentation) from the teacher, and both student and teacher will make eriodic observations and tests (checking) to determine progress and he probable need for further instruction or additional practice.

hoice of Method

The shop teacher must realize that his skill as a worker in a trade oes not necessarily qualify him to teach the trade to others. His effectiveess as an instructor depends not only upon his ability as a craftsman, ut also upon the efficiency with which he uses the various instruction ıethods and devices. In many teaching situations knowledge of the orrect method is as important as knowledge of the element itself. Beause of the advisability of varying the method, it is highly essential that he instructor be familiar with the various forms of instruction.

Certain elements in a trade may be taught by one method, while thers may demand another or several methods to bring about a thorough

understanding by the learner. The choice of method is influence such factors as:

1. Facilities for giving instruction
2. Nature of the subject
3. Experience and ability of the instructor
4. Mental capacity of the student
5. Background of skill and information of the student
6. Time available

The Demonstration

The demonstration is probably the most effective method for teac shop work. It consists of showing and explaining how something sh be done. Its principal use for shop instruction is to give direction performing new trade skills. It is most effective when given ir diately before the learner first attempts a new skill and when sui sensory instruction aids are used to help clarify ideas.

Shop Demonstrations May Be Given:

1. To present needed instruction or information to the entire cla
2. To instruct a small group within the class
3. To give individual instruction as may be needed in the dev ment of a trade skill

Elements of a Good Demonstration:

1. Every item required for the demonstration is at hand and pro arranged.
2. Students comfortable and in a position to see and hear clearl
3. Distracting influences absent.
4. Students and instructor aware of a definite aim or objective.
5. The topic or instruction unit of suitable length and withou many new elements.
6. Learning factors presented in a logical, orderly sequence slowly enough to permit learners to grasp the key points.
7. Safety hazards pointed out and safe practices demonstrated.
8. Display of expert skill by the instructor in handling tools, e ment, and materials.

   Such display creates confidence in the instructor on the pa the students, inspires them to greater effort, and teaches correct methods and procedures.
9. Provision for and encouragement of questioning by the stu as a means of clarifying instruction.

10. Questioning by the instructor as a check on how well the students have grasped the content of the lesson.

    Such questioning will also encourage students to think and to broaden their knowledge of the subject.

11. The use of correct English suited to the background of the students, explanation of new trade terms used in the demonstration, a well-modulated tone of voice, and a pleasing manner.
12. Instructional aids within the comprehension of the students.
13. Clinching the lesson by quickly reviewing the high points.

    Students should be given an opportunity to clear up anything not thoroughly understood.

Demonstroting Wheel Bolancing

Williamsport School photo

Instruction Sheets

[See Visual and Sensory Aids on p. 76.]

The term "instruction sheets" as used here includes all forms of wr or printed instructions. They are intended to supplement the demonstration and other methods of teaching and thus permit th structor to use his time more efficiently. Through the use of such mat he is able to provide for individual differences in ability, aptitude attainment among his students.

Instruction sheets are usually designated according to the purpose type serves. Those most commonly used in giving instruction in s work are:

1. Job Sheet
2. Operation Sheet
3. Information Sheet
4. Assignment Sheet

A Good Instruction Sheet

1. Presents an attractive appearance
2. Indicates the area to which it belongs
3. States the objective clearly
4. Gives directions and information in short simple words, senten and paragraphs
5. Has operations or steps arranged in proper sequence
6. Has simple well-made drawings
7. Has drawings and other illustrations well placed on the sheet
8. Has questions designed to provoke pupil thought
9. Permits some opportunity for student planning and initiative
10. Has exact and specific references

The Job Sheet

The job sheet gives directions for doing a complete work job. describes by means of drawings, photographs, etc., and/or written sp fications, the job to be done. It lists the operations to be performed unlike the operation sheet, does not give detailed steps for their formance. The sheet contains:

1. The name of the job. Example: "Building an Open Fireplace"
2. The objective of the job
3. Lists of tools and materials required
4. Drawings, specifications, and other means of describing the job
5. Brief statement of facts or information necessary for the succes completion of the job

6. The operations to be performed in proper sequence
7. Questions concerning the job
8. Checking the work

e Operation Sheet

The operation sheet gives definite and specific instructions for performing a trade operation through proper manipulation of hand and chine tools. It contains:

1. Identification of the area or classification of which it is a part
2. Title of the sheet. Example: "How to Plane an Edge"
3. Objectives of the lesson
4. A short statement to make known the use of the operation in the trade
5. Directions in detailed step-by-step order for the performance of the operation. Drawings appear where indicated
6. Safety precautions to be observed
7. Thought-provoking questions
8. Specific references for additional information

e Information Sheet

The information sheet presents facts of science, drawing, mathematics, mulas, and other selected information necessary to the successful actice of a trade. It does not give directions in manipulation of tools equipment. It contains:

1. Title of the sheet. Example: "How to Judge the Quality of Building Sand"
2. Brief statements of the facts and information concerning the topic
3. Illustrations and drawings necessary to clarify the topic
4. Questions designed to direct thought and discussion to the practical application of the information
5. References for further study of the topic

e Assignment Sheet

The assignment sheet is used to direct study and investigation. Since may be used in many different situations its form may vary considerably. a shop teaching device it may be used to assist in the solution of cial problems, such as the practical application of certain principles ng studied. Assistance may be given to the student by means of questns or through direct statements. It contains:

1. The title and specific objectives. Example: "Calculating the Dimensions of a Fireplace Flue"

2. Sources of information
3. Statements or questions designed to direct thought, observa or procedure

Visual and Sensory Aids

The proper use of instruction aids provides an effective metho teaching shop work. The instructor should be alert to any elemen his course of study in which such an aid will clarify ideas. Models, s mens, films, pictures, and other sensory aids are often valuable for secu complete understanding of the subject. They are effective in reinfo the demonstration and in making instructions more interesting t students. They are valuable due to their appeal to more than one and due to their ability to attract and hold attention.

Many such aids are available free of charge from industrial conc and may usually be purchased or rented at reasonable cost, or they be prepared by the shop instructor or pupils under the direction o shop instructor.

In selecting or assigning an instruction aid the shop teacher sh consider these questions:

1. What do I wish to illustrate?
2. Does this aid fit the lesson? Does it illustrate the point exa
3. Is it accurate and up to date?
4. Can it be used effectively for the students under my instructio
5. It is free from undesirable propaganda or advertisement?
6. Is it of such proportion and construction as to make it easy safe to use or handle?

Types of Teaching Aids

Some of the most effective shop instructional aids and their char istics and uses are:

Models: To supplement and clarify verbal instruction. The outs ing characteristic is the three dimensional quality. Have many o advantages of the real article.

Blackboard: May be used advantageously for group instruction. plements explanation. To clarify instruction by means of dra May be used repeatedly. Useful in giving directions in procedure

Bulletin Board: For the display of drawings, pictures, charts, diag etc., to motivate, supplement, and enrich learning.

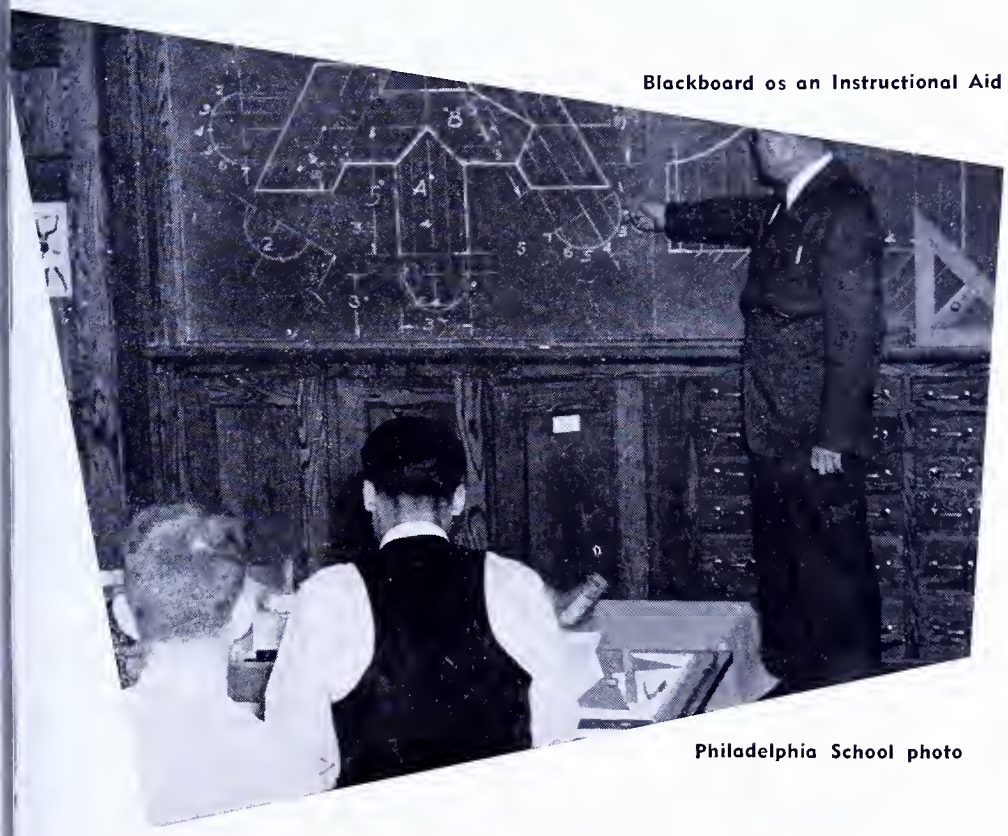
Filmslides: To supplement verbal instruction. Permits extended concentration upon a specific point. Useful for group study of instructions, proportion, etc.

Motion Picture (silent and sound): Demonstrating a skill. Giving instructions in procedure. Illustrating a process. Depicting motion. Valuable for group instruction.

Exhibits and Mock-Ups: May be used to demonstrate certain basic principles of a work mechanism.

Field Trips: Visits to industry enabling pupils to see how the skills they are learning in school are put into practice in production.

In using filmstrips, slides, and motion pictures, the instructor can eadily adapt the four-step teaching method in his presentation. He hould know the content of the films or slides, and use them only as hey fit into the course of instruction. He should acquaint the pupils vith an overview of what they are to see, and correlate it with the work hey are doing, thereby arousing interest in its presentation. In presenta-



Blackboard as an Instructional Aid

Philadelphia School photo

tion, filmstrips and slides provide opportunity for discussion during t showing. Pupils apply what they are seeing, or what they have se to their own shop experiences. Test the group to determine the extent learning after they have seen the films or slides.

Field trips represent an opportunity to gain valuable informati therefore, they should be planned to obtain the maximum benefit fr them.

THE FIELD TRIP AS A TEACHING AID

1. *Preliminary Teacher Planning*
   a. Why was this particular field trip recommended?
   b. How was the trip introduced?
   c. What cooperative teacher-pupil planning is necessary?
   d. What should be included in orienting the class with the dustry visited?

2. *Orientation of the Class*
   a. Brief the pupils on industry, its history, product, working con tions, apprenticeship, employe welfare, occupations involved production, labor relations, wages, etc.
   b. Caution pupils as to safety precautions to observe during vi
   c. Discipline during the trip
   d. Time and place of meeting
   e. Proper attire for trip
   f. Things to observe which relate to the work they are doing

3. *The Visit*

   Students should be encouraged to note particular methods a techniques in preparation for the discussion or evaluation of t trip after returning to school.

4. *Evaluation of the Visit*

   Pupils should be given an opportunity to ask questions whi may be answered in group discussion. The teacher may ask qu tions or devise a written test to determine to what extent the t contributed to their learning.

5. *Follow-up*
   a. Resumé of what was learned and pupil comments should be se to those in the industry who conducted the tour and made t visit possible.
   b. Letters of appreciation from the class committee and the structor should be a part of the follow-up.

Standards and Measurement of Attainment

A student's proficiency in his work is dependent upon his ability to aquire an understanding of the fundamental principles of his trade and upon the development of proper habits and skills in the applications of these elements to the solution of trade problems.

Standards of Work

In organizing an adequate course of study in shopwork, the problem of evaluating student progress must be considered. Before this can be done, definite goals of accomplishment for each trade skill, individual job, work area, and course of study as a whole must be established. The basis for determining such standards are those required by industry. It should not be demanded or expected, however, that the student immediately meet the requirements of the commercial shop. But it is important that the checking program show satisfactory student development and that industrial standards of workmanship be steadily approached and, if possible, ultimately attained.

Measurement Based Upon Objectives

In a well-planned course of study in shopwork suitable jobs are selected as vehicles for developing specific trade skills as determined by an analysis of the trade. Thus every job is built around definite objectives. A valid measurement method will test attainment according to the objectives of these various instruction units. When conflict appears between the elements covered in a job, as against those the test is designed to measure, the test is of little value and is unfair to the student.

What to Measure

A study of the aims of shopwork reveals the following factors to be considered in measuring success in such work:

1. *Quality*—The quality of a completed job is determined by how well the various tool or machine operations have been done, *i.e.,* to what extent the object is properly square, smooth, level, solid, accurate in dimensions, etc.
2. *Speed*—The time required to complete a typical trade job or operation, maintaining the quality. Time limits comparable to those in industry must be established for each instruction unit.

3. *Manipulation of Tools and Materials*—The student who learns to use the tools and materials of his trade properly can make rapid progress in the trade through practice. Before such skills can be measured it is necessary to determine what constitutes correct practices in the trade.
4. *Initiative and Planning*—The ability to analyze trade problems and to plan and carry out their solution
5. *Trade Information*—Facts of science, trade mathematics, safe trade practices, information centered around the tools and materials of the trade, and other information contributing to the complete training of the student

Attainment of Trade Standards

An important part of every shop teacher's duties is to determine the extent to which established trade standards are being attained. While many capable shop teachers are able to judge progress and performance with reasonable accuracy through observation, they should not rely upon this method of appraisal alone. They should have reliable *objective* instruments for measuring attainment in the various elements of the work. Subjective hit-or-miss judgment should not be relied upon. Two teachers rating the same project or performance will rarely arrive at the same result. Teachers with high requirements will tend to give low ratings, while those with low requirements will tend to rate high. And no two teachers are likely to give equal weight to the various elements of a job being judged.

Objective Type Tests

Many reliable instruments for measuring shopwork in various trades have been developed. Any such material should be carefully selected by the instructor, keeping in mind its relationship to the objectives of his shop program. For many trades, however, such testing material is not available and must be prepared by the instructor. While the average shop teacher has neither the time nor training required for the development of a comprehensive measurement program, he should not be content to depend entirely upon observation and personal judgment to determine student progress in the trade. He should study the many accepted practices and principles for constructing and administering testing devices from the viewpoint of applying them to the work of his shop. He should also be led to realize that measurement of shopwork

n be no more accurate than the vehicle of measurement he uses and his ility to use it, and that without adequate measurement he cannot ain highest efficiency as an instructor.

ethods of Measuring

ality

Quality may be measured by comparing the completed job with pre-vously-prepared quality scales, which are samples or specimens showing e range of workmanship and the commercial standards demanded for ch work. It may also be measured by subjecting the object to some

Operotion of the Linotype

Eoston School photo

physical force, such as testing the strength of a weld in a device which indicates on a dial the breaking point.

A less objective and less accurate method of determining quality is by general observation of procedure and product.

Speed

Speed may be measured by comparing the time consumed by the student in performing a typical trade job or operation with the time required by an experienced worker in industry. But unless quality is maintained, the time required to complete a job does not furnish a proper basis for measuring speed.

Manipulation of Tools and Materials

Because of the difficulty of constructing objective tests for measuring correct tool techniques this element is usually judged subjectively. When the instructor is himself a competent mechanic, and therefore familiar with what constitutes good practice in the use of the various tools of the trade, the lack of an objective test for measuring this factor is not a serious matter. In grading this factor the instructor should consider this question: "Did the student use and manipulate tools and materials with satisfactory dexterity as observed from time to time and as demonstrated by the instructor?"

Initiative and Planning

At present, suitable objective tests for measuring this factor in trade work are not available, but some knowledge of a student's ability to plan his own work may be obtained by presenting him with a typical trade problem, having him make plans for its solution, and then comparing the results with accepted commercial procedure.

Trade Information

Trade information can be measured most adequately by means of the conventional objective type tests. In planning a test for this purpose consideration should be given to the various forms of such tests to determine the type best suited for the purpose.

Types of Written Tests

Completion—An incomplete statement having a blank space for a word or phrase that makes the statement true.

Multiple Choice—An incomplete statement that leaves a space for a choice of a number of words only one of which makes the statement true.

True or False—The student indicates whether a given statement is true or false.

Matching—Two columns of words, phrases, objects, terms, etc., are listed. The student matches the items in one column with the proper items in the other column.

Other Factors to be Considered

While emphasis should be placed upon measuring the five factors discussed previously, this will not result in a complete appraisal. Personal characteristics of the student must be given due consideration—leadership, student interest, and other personal qualities must be given considerable weight when determining his proficiency. The following general suggestions are offered in connection with appraising and recording student attainment:

1. The personal characteristics of the student and his success in the accomplishment of the objectives of the course should be considered.
2. The grade of every job completed and of every skill learned should be recorded.
3. A general estimate should be made of each student's attainment at least once each semester.
4. A record chart, by means of which a student's progress may be compared with that of other members of the class, should be maintained.
5. The degrees of attainment may be classified as follows:

A or 4—*Superior*	C or 2—*Good*
B or 3—*Very good*	D or 1—*Fair*

E or 0—*Unsatisfactory*

Student Shop Progress Records

Recording student progress and attainment is an essential part of the measurement program. Some examples of the various types of forms that may be used follow, but it is quite likely that modifications must be made if the chart is to function effectively in a particular shop. Therefore the examples are only suggestive.

Desirable Characteristics of the Chart

1. In keeping with general school policies
2. Includes only valuable and necessary information

3. Simple to post
4. Easy to interpret
5. Easy to file
6. Of durable quality

The Class Progress Chart—The Class Progress Chart, Figure 15, reveal individual progress as compared with that of other members of the class Comparison may be on the basis of either completed jobs or operations

The Individual Shop Record Card—Figures 16 and 17, pages 86 and 87 illustrate the individual shop record card. This card contains charts tha reveal graphically the quality and quantity of the work completed together with evaluations of personal character and social traits. It con tains the shop course outline and permits checking of jobs completed skills developed, etc. It is based upon semesters or other suitable repor periods.

Learning Lens Grindir

Philadelphia School photo

CLASS PROGRESS CHART

√ = Satisfactory Completion

Student Number	Name	Jobs (or Operations)															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Typical Student Progress Wall Chart. Jobs or operations may be checked to denote satisfactory completion or may be assigned for each job or operation completed.

FIGURE 15.

INDIVIDUAL SHOP RECORD

Photo

Name _____ Birth Date _____
Last Middle First

Address (1) _____ (2) _____

(3) _____ (4) _____

Parent or Guardian _____ Phone _____

Business Address _____ Occupation _____ Phone _____

Entered from _____ IQ–HS _____

Grade Completed _____ IQ–TS _____

Date Entered _____ Date Left _____ Certificate Issued _____

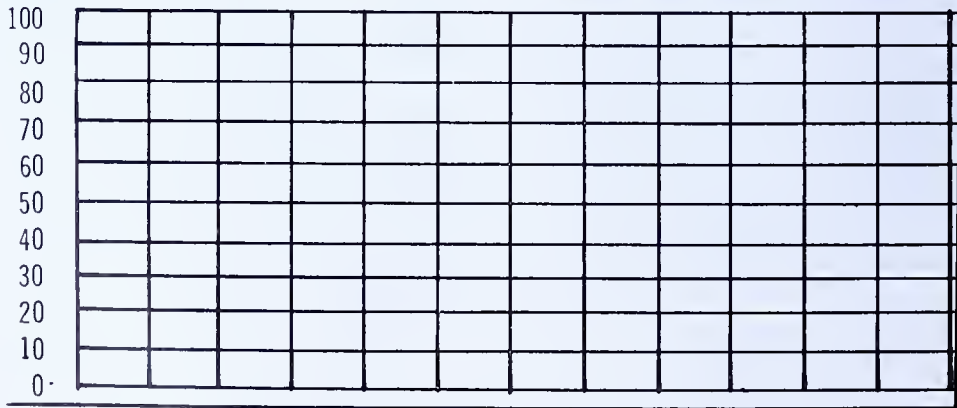
Record of Transfer _____

Characteristics and Developments

Fir

Attitude									
Quality of Work									
Speed in Production									
Manipulation of Tools									
Trade Information									
Industry									
Dependability									
Initiative									
Leadership									
Co-Operation									
Interest									
Honesty									

Graph Showing Percentage of Shop Course Completed and Grade



(Front of Card)

FIGURE 16.

1. Slaking Lime	0.5	A
2. Mixing Mortar, Lime	0.4	B
3. Mixing Mortar, Cement	0.4	B
4. 4" Jam Lead	0.3	B
5. 4" Carners	0.6	A
6. 4" Walls	0.6	B
7. 8" End Leads, Run. Bonds	0.6	C
8. 8" Carner Lead, Run. Bond	0.8	etc.
9. 8" Wall, Running Bond	0.8	....
10. 8" American Bond Wall	0.9	....
11. Corner 8" American Band	0.8	....
12. 13" Walls, American Bond	1.0	....
13. Corner 13" American Bond	1.1	....
14. Pilasters	1.2	....
Value af this Unit	10.0%	

Unit 2—ADVANCED CONSTRUCTION

1. Chases	1.2	....
2. Piers	1.2	....
3. Heavy Duty Walls	1.4	....
4. Quained Walls	0.8	....
5. Brick Sills	1.0	....
6. Squint Quoins	0.6	....
7. Chimney Canstructian	1.2	....
8. Chimney Tops	1.0	....
9. Corbeling and Racking	1.0	....
10. Wood Window Frame, with Sill and Lintel	1.6	....
11. Blocking	1.6	....
12. Taothing	1.6	....
13. Battered Piers	1.4	....
14. Corner Quains	1.4	....
Value af this Unit	17.0%	

Unit 3—ENGLISH, ENGLISH AND RELATED BONDS

1. Corners, English Bond	0.8	....
2. Pilaster Running, English Bond	0.8	....
3. Corners, English Cross Bond	0.8	....
4. Corners, Flemish Bond	0.6	....
5. Flemish Bond Walls	1.0	....
6. Special Designs, Flemish Bond, Porch Wall	2.0	....
7. Dauble Flemish Band Walls	1.5	....
8. Garden Wall Bond	1.5	....
Value of this Unit	9.0%	

Unit 4—HOLLOW WALL BONDS

1. Rolak-bak Bond	0.8	....
2. All-rolok, Flemish Band Walls	0.8	....
3. Cavity Walls	0.6	....
4. Hollow Tile Backing	1.6	....
5. Hallow Tile Partitions	1.2	....
Value of this Unit	5.0%	

Unit 5—ORNAMENTAL BRICKWORK

1. Basket Weove Pattern	1.0	....
2. Belt Courses	1.8	....
3. Flush Patterns	1.6	....
4. Header Band Patterns	1.6	....
5. Herringbone Patterns	3.0	....
6. Ornamental Corbeling, Carnices	1.4	....
7. Diamond Patterns	2.0	....
8. Circular Patterns	3.6	....
Value of this Unit	16.0%	

Unit 7—ARCHES

1. Segmental Rawlock	1.6	....
2. Segmental Relieving	1.8	....
3. Segmental Banded	1.6	....
4. Gauged Segmental	3.0	....
5. Semi-Circular	3.0	....
6. Semi-Elliptical and Three-Center	2.2	....
7. Circular or Bullseye	3.6	....
8. Gathic	2.4	....
9. Flat or Jack	2.8	....
10.		
9. Flat or Jack	2.8	....
Value af this Unit	22.0%	

Unit 8—SPECIAL MATERIAL AND LAYOUT WORK

1. Irregular Curves	1.0	....
2. Veneering	1.4	....
3. Fire Brick Walls	2.2	....
4. Steel Sash	2.0	....
5. Enameled Brick Walls (Buttered)	1.6	....
6. Fireplaces	3.6	....
7. Steps and Walks	2.8	....
8. Circular Walls, Stacks, Sewers, etc.	2.0	....
9. Concrete Block Walls	2.0	....
10. Glass Block Panels	2.4	....
Value of this Unit	21.0%	
Tatal Value of Units	100.0%	

COMMENTS

.....

PLACEMENT RECORD

Firm	Address	Weekly Wage	Date Began	Date Left

(Back of Card)

FIGURE 17.

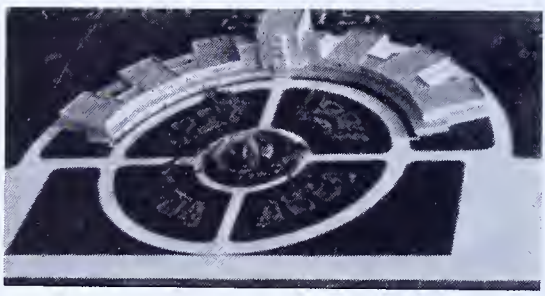
The Student Report Card—The student report card is a card by w student and parents are formally notified of student attainment. It show:

1. Attendance and punctuality
2. Evaluation of specific character traits
3. Progress in shop practice
4. Acquisition of trade information

The Certificate of Completion

The Certificate of Completion (Figures 18, 19 and 20) is a recor achievement given to the student upon graduation or upon lea school, provided that certain minimum requirements have been pleted. It reveals to a prospective employer the exact skills in w the student has been trained and which he should be able to per in industry. The certificate may also indicate achievement in re trade and general subjects.

Below is the cover page of a Certificate of Completion. The mat on pages 89 and 90 represents two succeeding pages of the Certi showing the time allotment for a bricklaying course. Space is all for grade records for shopwork (page 89) and for contributory related subjects (page 90).



CERTIFICATE OF WORK COMPLETED

GRIVELY HILL VOCATIONAL HIGH SCHOOL
THE BOARD OF PUBLIC EDUCATION
DORNSIFE, PENNSYLVANIA

FIGURE 18.

Unit 1—Elementary Brickwork	
1. Slaking Lime	0.5 ....
2. Mixing Mortar, Slaked Lime	0.4 ....
3. Mixing Mortar, Hydrated Lime	0.4 ....
4. 4" Jam Lead	0.3 ....
5. 4" Corners	0.6 ....
6. 4" Walls	0.6 ....
7. 8" End Leads, Running Bond	0.6 ....
8. 8" Corner Lead, Running Bond	0.8 ....
9. 8" Wall, Running Bond	0.8 ....
10. 8" American Bond Wall	0.9 ....
11. Corner 8" American Bond	0.8 ....
12. 13" Walls, American Bond	1.0 ....
13. Corner 13" American Bond	1.1 ....
14. Pilasters	1.2 ....
Value of this Unit	10.0%
Unit 2—Advanced Construction Jobs	
1. Chases	1.2 ....
2. Piers	1.2 ....
3. Heavy Duty Walls	1.4 ....
4. Quoined Walls	0.8 ....
5. Brick Sills	1.0 ....
6. Squint Quoins	0.6 ....
7. Chimney Construction	1.2 ....
8. Chimney Tops	1.0 ....
9. Corbeling and Racking	1.0 ....
10. Wood Window Frame, with Sill and Lintel	1.6 ....
11. Blocking	1.6 ....
12. Toothing	1.6 ....
13. Battered Piers	1.4 ....
14. Corner Quoins	1.4 ....
Value of this Unit	17.0%
Unit 3—Flemish, English and Reloted Bonds	
1. Corners, English Bond	0.8 ....
2. Pilaster Running, English Bond	0.8 ....
3. Corners, English Cross Bond	0.8 ....
4. Corners, Flemish Bond	0.6 ....
5. Flemish Bond Walls	1.0 ....
6. Special Designs, Flemish Bond, Porch Wall	2.0 ....
7. Double Flemish Bond Walls	1.5 ....
8. Garden Wall Bond	1.5 ....
Value of thjs Unit	9.0%
Unit 4—Hollow Wall Bonds	
1. Rolok-bak Bond	0.8 ....
2. All-rolok, Flemish Bond Walls	0.8 ....
3. Cavity Walls	0.6 ....
4. Hollow Tile Backing	1.6 ....
5. Hollow Tile Partitions	1.2 ....
Value of this Unit	5.0%
Unit 5—Ornamental Brickwork	
1. Basket Weave Pattern	1.0 ....
2. Belt Courses	1.8 ....
3. Flush Patterns	1.6 ....
4. Header Bond Patterns	1.6 ....
5. Herringbone Patterns	3.0 ....
6. Ornamental Corbeling, Cornices	1.4 ....
7. Diamond Patterns	2.0 ....
8. Circular Patterns	3.6 ....
Value of this Unit	16.0%
Unit 6—Arches	
1. Segmental Rowlock	1.6 ....
2. Segmentol Relieving	1.8 ....
3. Segmental Bonded	1.6 ....
4. Gauged Segmental	3.0 ....
5. Semi-Circular	3.0 ....
6. Semi-Elliptical and Three-Center	2.2 ....
7. Circular or Bull's Eye	3.6 ....
8. Gothic	2.4 ....
9. Flat or Jack	2.8 ....
Value of this Unit	22.0%
Unit 7—Speciol Material and Layout Work	
1. Irregular Curves	1.0 ....
2. Veneering	1.4 ....
3. Fire Brick Walls	2.2 ....
4. Steel Sash	2.0 ....
5. Enameled Brick Walls (Buttered)	1.6 ....
6. Fireplaces	3.6 ....
7. Steps and Walks	2.8 ....
8. Circular Walls, Stacks, Sewers, etc.	2.0 ....
9. Concrete Block Walls	2.0 ....
10. Glass Block Panels	2.4 ....
Value of this Unit	21.0%
Total Value of Units	100.0%

FIGURE 19.

BRICKLAYING

CONTRIBUTORY SUBJECTS—Time Allotment, 25%

	FIRST YEAR		THIRD YEAR	
English	I ..... II		English	V ..... VI .....
Social Studies	I ..... II		Social Studies	V ..... VI .....
General Mathematics	I ..... II		Geometry (Applied)	I ..... II .....
Physical Education	I ..... II		Physical Education	V ..... VI .....
	SECOND YEAR		FOURTH YEAR	
English	III ..... IV		English	VII ..... VIII .....
Social Studies	III ..... IV		Social Studies	VII ..... VIII .....
Algebra (Applied)	I ..... II		Trigonometry (Applied)	I ..... II .....
Physical Education	III ..... IV		Physical Education	VII ..... VIII .....

RELATED SUBJECTS—Time Allotment, 25%

RELATED DRAWING

Unit I	Sketching, Orthographic	.....
Unit II	Sketching, Isometric and Oblique	.....
Unit III	Scale Drawings	.....
Unit IV	Construction Details	.....
Unit V	Chimneys and Fireplaces	.....
Unit VI	Arches and Lintels	.....
Unit VII	Ornamental Brickwork Layouts	.....
Unit VIII	Builders' Plans and Specifications	.....
Unit IX	Perspective Drawings	.....

SCIENCE

Unit I	Introduction to Science	.....
Unit II	Mechanics of Solids	.....
Unit III	Mechanics of Liquids and Gases	.....
Unit IV	Heat	.....
Unit V	Electricity, Sound and Light	.....
Unit VI	Strength of Materials and Laws of Motion	.....
Unit VII	Elementary Chemistry	.....
Unit VIII	Chemistry of Trade Materials	.....

RELATED MATHEMATICS

Unit I	Measurements	.....
Unit II	Formulae for Mixes	.....
Unit III	Computing Areas	.....
Unit IV	Computing Volumes	.....
Unit V	Pitches	.....
Unit VI	Corners and Angles	.....
Unit VII	Arches	.....
Unit VIII	Fireplaces and Chimneys	.....
Unit IX	Estimating: Costs, Materials, Deductions	.....

RELATED THEORY

Unit I	Trade Terms	.....
Unit II	Tools	.....
Unit III	Trade Publications	.....
Unit IV	Materials	.....
Unit V	Processes	.....
Unit VI	History and Development of the Trade	.....
Unit VII	Safety	.....
Unit VIII	Building Codes and Ordinances	.....
Unit IX	Simple Contracts and Agreements	.....

Time in School—Date entered.....Date left.....

This Certificate is issued to.....upon the satisfactory completion of the work indicated, the incomplete parts of the course being ruled out.

Principal

Evaluative Criteria for Day School Shop Instruction

For the purposes of determining to what extent shop instruction is eing effectively conducted the following general criteria indicate items be considered. Since instruction depends to some extent on shop quipment and facilities, criteria for evaluating these as well as shop istruction are included. No attempt is made to indicate a rating for ch item. Any system of rating which the evaluator may deem advisable left to his discretion.[1]

1. The shop facility is adequate in terms of area, location, suitability, type and kind of structure; the condition of the structure lends itself well to the shop it houses for the number of students enrolled.
2. The shop facility is provided with at least two exits that meet the requirements of the Department of Labor and Industry and the School Code.
3. The shop facility is provided with a service entrance and the necessary loading dock equipment.
4. The shop facility is provided with adequate natural lighting.
5. The shop facility provides a minimum standard of square feet of floor area per student enrolled in the shop at any one time.
6. The artificial lighting is modern, is in keeping with present industrial lighting systems, and provides a minimum of 25 foot-candles at each work station in the shop.
7. The floor is in good condition and does not present a safety hazard to the students.
8. The shop facility is equipped with the following:
   - Approved fire extinguishers to take care of fires common to this particular shop
   - Lockers to house personal effects of the students
   - Approved power outlets
   - Approved light outlets
   - Approved safety control stations
   - Approved washing facilities
   - Approved drinking fountain
   - Approved lavatory facilities
   - Approved shower facilities (sanitary floors and automatic mixing valves)
   - Approved heating and ventilating system
   - Approved exhaust system
   - Adequate gas outlets

[1] See *A Procedure for Evaluating a Local Program of Trade and Industrial Education* and its companying forms, American Technical Society, Chicago, Illinois, 1952.

Adequate water outlets
Adequate compressed air outlets
Adequate storage and containers for inflammable material approved by the Fire Underwriters
Adequate storage for steel chips, shavings, sawdust, etc.
Adequate supply room
Adequate storage facilities, including racks and shelves
Adequate tool room facilities
Teacher's office
Project display cabinets

9. The shop is suitably equipped with the necessary tools, machi and equipment to train students effectively in the trade or occ tion for which training is given.
10. The shop is well planned and laid out in accordance with mo industrial plant layouts and arranged for instructional purpose
11. The course of study for the shop is current and in keeping present practices in the trade or occupation being taught.
12. The teacher is teaching his trade or occupation as outlined in course of study.
13. The students are taught the correct usage of approved fire-figh equipment.
14. Teaching methods and procedures are effective and in agreer with the latest approved instructional and industrial methods procedures.
15. The teaching techniques and methods are in line with technolo changes in industry.
16. Daily lesson plans are used in detail as a means of attaining aims and objectives of the trade or occupation being taught.
17. Instruction sheets are used in detail as a means of assisting student and of attaining the aims and objectives of the trad occupation being taught.
18. There is no prolonged training in skills for which there is demand in the local industries.
19. The teacher has developed and uses a grading system which r nizes personality traits as well as skill and technical informati
20. The teacher maintains the following records and keeps them rent:

Personnel records
Machine operation permits
Safety examination results
Progress records
Disciplinary records
Shop committees served on by students
Outstanding traits possessed by students

Accident reports
Injury reports
Student shop reports

21. The teacher maintains the following inventories:
    Machinery
    Equipment
    Hand tools
    Materials
    Supplies
    Textbooks
    Reference books
22. Materials and supplies are well organized and are ready for the students when the class enters the shop.
23. The teacher develops and maintains effective relationships with industrial management and representatives of labor in order to establish sound training objectives and adequate work standards.
24. The teacher develops, in cooperation with the director of vocational education and craft consultants, course outlines and progress charts based upon analyses of the jobs done in industry.
25. The teacher has developed teaching aids of various types which assist him in reducing the learning time in teaching students.
26. The teacher has developed methods and devices for measuring the accomplishments of his students in terms of the aims and objectives of the trade or occupation he is teaching.
27. The teacher makes constructive suggestions to the director of vocational education for the improvement of the vocational-industrial department.
28. The teacher assumes responsibility and leadership for at least one extracurricular school activity.
29. The teacher understands his place and relationship to other teachers and administrative personnel on the personnel organization chart as submitted to the evaluation staff.
30. The teacher visits the homes of his students.
31. The teacher keeps up to date in the trade or occupation he is teaching by regularly attending trade association meetings, craft association meetings, and engineering society meetings.
32. The teacher keeps up to date in the trade or occupation he is teaching by reading current trade magazines, periodicals, and technical publications in his field.
33. The shop is well managed as evidenced by the following:
    Every student has a work station.
    Every student is properly dressed for work.
    The teacher is properly dressed for work.

Every machine is guarded in accordance with Department
Labor and Industry regulations.
Students are using safety devices provided.
Students are engaged in purposeful activity.
Morale of the class is high.
Discipline of the class is good.
Shop housekeeping is good.
Toolroom system is good and in keeping with industrial toolro
systems.
Hand tools are sufficient, in good condition, and well maintain
Machinery and equipment is of the industrial type, in good c
dition, and is well maintained.
The type and quality of the work produced by the students are
keeping with the type and quality of work produced in indus
employing personnel in the trade or occupation for which tra
ing is being offered.

34. The shop is well equipped with a technical library containing
erence books, technical dictionaries, encyclopedias, technical
stracts, and technical magazines related to the trade or occupat
being taught in the shop.

Shop Organization

Success in shop teaching depends largely upon the ability of the
structor to organize his class on an efficient basis. Not only does such
organization result in relieving the instructor of many minor details
routine duties, thereby allowing him a maximum of time for actual
struction, but it also provides many valuable experiences for the pu

It must be emphasized, however, that the function of any shop stu
personnel organization is not to assume the duties of the teaching, m
tenance, or janitorial staffs. Too much responsibility should not be pl
upon the pupils at once and a proper attitude should exist toward
organization if it is to function successfully.

Types of Personnel Organizations

Shop student organizations may vary according to the nature of
trade being taught, the number of pupils in the class, the method
storing and issuing tools and materials, kinds of equipment, wor
areas, class schedules, personality of the teacher, and other condit
that may prevail in a particular shop. There are, however, certain p
ciples applicable to all forms of student shop organization:

1. Positions are created after careful consideration of the needs of the shop. They should be based upon practical and necessary duties.
2. The purpose of the organization as a whole and the duties of each position should be made clear to every student.
3. Assignments are rotated so as to give every student an opportunity to serve in each position.
4. The term of service in each position should be long enough to permit effective functioning of the organization, but not so long as to cause the younger members to lose interest.

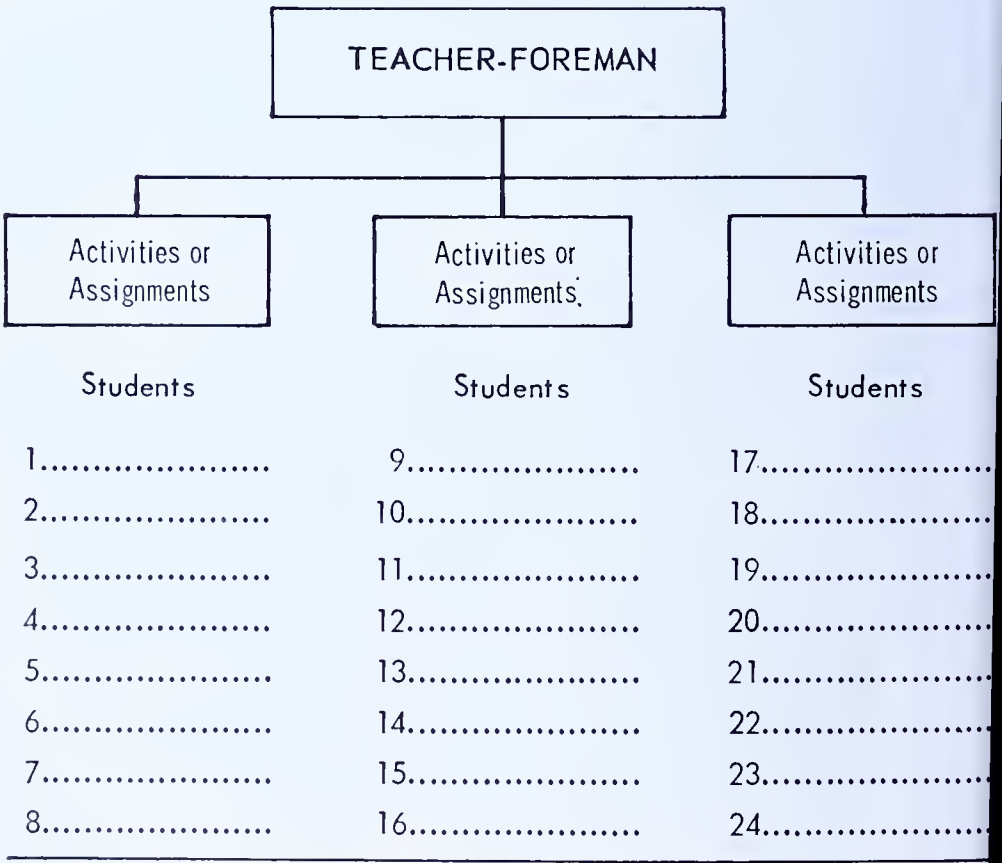
Practice in Radio Testing

Pittsburgh School photo

5. The organization must never be thought of as a device for disciplining wayward students.
6. Duties generally recognized as being objectionable and beneath the dignity of students should not be a part of any organization position.
7. Proper emphasis should be placed upon training value as distinguished from maintenance of desirable teaching and learning conditions.

In recognition of these basic principles two basic methods of organizing a shop class are indicated:

1. The Teacher-Foreman Method
2. The Teacher-General Manager Method.



Teacher-Foreman Plan of Shop Personnel Organization

FIGURE 21.

The Teacher-Foreman Plan

The Teacher-Foreman method of organizing a shop class is used primarily where there are small classes. The teacher is the foreman and is in direct charge of all activities of the pupils. With the cooperation of the pupils he outlines all duties and makes all assignments. All pupils report directly to him. A sample organization chart for this method is shown in Figure 21.

The Teacher-General Manager Plan (See page 98)

The Teacher-General Manager method of organization is more applicable to the large shop class. In this organization duties are delegated to responsible persons in the class. A shop superintendent is appointed who is responsible for the operation of the method and who may appoint pupils to assist him directly in the issuing of tools and supplies, maintaining general shop safety, and directing personnel. Under the shop superintendent are foremen who are in charge of pupils within certain shop areas. An area may be determined in several ways as

1. Specific shop working areas
2. Shop safety and housekeeping
3. Groups of machines
4. Groups of similar activities

Pupils within designated areas report directly to their respective foremen, who may have assigned specific duties to the members of the group or area. In many cases it may be well to pattern the organization after that which exists in local industry even to the extent of having the pupils organized as labor is organized as a union, having shop committees and shop stewards. In all cases the teacher is the authority and all pupil leaders, foremen, and superintendents report to him. A guide to establishing the Teacher-General Manager method of organization is shown in Figure 22, page 98.)

Regardless of the method being used, a chart showing the line of authority and succession is an important item in a shop student personnel organization. The duties assigned to each group and executive should be clearly stated. The chart should be attached to the bulletin board and also hung in some other appropriate place in the shop so that it may be referred to readily.

Teacher-General Manager Plan of Shop Personnel Organization

Advantages of a Student Personnel Organization

The shop class organization when patterned after industry

1. Trains the student for the type of cooperative effort required by the post-school job
2. Provides training in the management of personnel affairs
3. Provides opportunities for the development of leadership
4. Trains for the acceptance of responsibility under leadership
5. Provides for the maintenance of working conditions and discipline essential to teaching and learning
6. Reduces the danger of physical injury
7. Promotes economy in the use of time, tools, and materials
8. Allows more time for instruction
9. Provides definite standards for rating students in cooperation, thoroughness, leadership, acceptance of responsibility, and other desirable character traits.

The Shop Toolroom

The proper functioning of the toolroom is one of the most important factors in successful shop teaching. It is a problem that calls for continuous planning and supervision if the work of the shop is to proceed in an orderly and effective manner. Various systems of arranging, issuing, and receiving tools are employed. But since no one system seems to work satisfactorily in all trade shops, the method selected must be adapted to the peculiarities of the particular shop. Whatever the method employed, due consideration should be given to convenience, visibility, and safety, in order to

Permit quick issuance, replacement, and accounting
Avoid unnecessary duplication
Maintain an adequate number and variety
Permit rapid inspection of conditions
Prevent damage or loss.

Tool Issuance by Means of

1. *A central toolroom or crib* from which all tools and appliances are issued singly or in kits (Figure 23, page 100, is an example).

   A student may requisition tools by means of

   a. A slip of paper on which he lists the tools needed and on which he signs his name

FIGURE 23.

b. A printed list on which he checks the tools needed and on which he signs his name
c. A metal tag or check that bears a number previously assigned to him. The tag is placed on a hook at the position normally occupied by the tools

In all these methods the requisition slip or tag is returned to the student when he returns the tools in good condition.

2. *A "kit" issued permanently to the student,* which he keeps in a locker, or workbench drawer. Only special tools are obtained from the toolroom.
3. *Certain tools allocated permanently to work stations* where they are locked in bench drawer or other safe container. All other tools are kept on panels conveniently located on the walls of the shop.

ool Regulations

Some suggestions for issuing tools follow. Their application depends pon the method of storage employed.

1. Each student is assigned a number.
2. Each student is issued sufficient checks with which to obtain required tools.
3. Each student is responsible for the return in good condition of all tools charged to him.
4. Students must replace lost tools or those damaged beyond repair due to carelessness.
5. The toolroom attendant is held accountable for all tools in the toolroom.
6. The toolroom attendant should not accept damaged tools from the student without the approval of the instructor.
7. The toolroom attendant should not return requisition slips or checks for tools that have not been properly cleaned.
8. It is the student's responsibility to obtain his requisition slip or check when the tool is accepted by the attendant.
9. The attendant is responsible for order and good housekeeping in the toolroom while he is in charge.
10. The toolroom attendant is responsible for minor repairs and reconditioning of tools in his care.
11. The toolroom attendant should report any shortage or irregularities to the instructor at the close of the session.
12. The student is held accountable for checks issued to him.
13. Working facilities should, whenever possible, be provided in the toolroom to permit the attendant to carry on his regular shopwork when not occupied with toolroom duties.

Method of Determining Shop Supply Needs

The problem of determining the total quantity of supplies needed fo a year's operation and the problem of preparing these supply lists fo bidding are difficult procedures. The following plan was developed t simplify and eliminate many of the time-consuming features of the com mon practice.

Developing the Plan

The first step is to compile a complete and comprehensive master lis of supplies needed by the various shops in the program. In compilin this list particular care must be taken to include common items used b more than one individual shop. Description of items must also be com plete. The following are the major headings for grouping items:

Paints and Stains
Abrasives—Sandpaper
Abrasives—Steel Wool
Grinding Wheels
Plywood and Composition Board
Lumber
Brushes
Auto Body
Angle and Band Iron
Steel
Drill Rod
Brass
Sheet Metal
Pipe
Pipe Fittings
Welding Rod and Flux
Hack Saw Blades
Nails and Brads
Round Head Wood Screws
Flat Head Wood Screws
Round Head Machine Screws
Flat Head Machine Screws
Carriage Bolts
Saw Blades
Straight Shank Drills
Numbered Drills
Lag Screws and Toggle Bolts
Hardware
Drafting
Miscellaneous Items
Electrical
Paper
Ink—Printing
Janitorial Supplies

Specific items are listed under each general grouping and sufficien space is provided on the left side of the page for each shop instructor t indicate the quantity of each item desired. An example is shown in Figu 24.

How the Plan Operates

The master list of shop supplies is rotated from one instructor to th other for checking. Each instructor lists the quantity of each item desire and any specialized items not appearing on the list are requisitioned o an individual requisition form. After checking is completed, the tot quantity of each item can readily be determined and the lists are read to be duplicated for mailing to supply houses for bidding. Figure 2 shows Figure 24 duplicated for bidding.

Dornsife Township School District
Vocational Division
SUPPLY LIST 1951-1952

Paints and Stains

Quantity	Description	Total Price
25 gals.	White Shellac	.....
11 gals.	Orange Shellac	.....
1 gal.	Cabinet Rubbing Varnish	.....
5 gals.	Spar Varnish	.....
15 gals.	Flat Lacquer	.....
15 gals.	Clear Gloss Lacquer	.....
30 gals.	Alcohol	.....
40 gals.	Turpentine	.....
5 gals.	Linseed Oil, boiled	.....
38½ pts.	Paste Wood Filler, natural	.....
36 tubes	Natural Plastic Wood	.....
40 lbs.	Putty	.....
15 gals.	Varnish Remover	.....
1 qt.	Ready Mixed Aluminum Bronze Paint	.....
15 lbs.	Paste Wax, Johnson's (in 1 lb. cans)	.....
12 tubes	Walnut Plastic Wood	.....
12 tubes	Mahogany Plastic Wood	.....

FIGURE 24.

ıpply Regulations

Some suggestions are presented for storing and issuing supplies. Deiled instructions necessarily have to be developed by each shop inructor in conformity with quantity and kind of supplies.

1. The instructor is responsible for requisitioning sufficient supplies meet the needs of the class.

VOCATIONAL SCHOOL SUPPLIES
Dornsife, Pennsylvania
Paints and Stains

Agriculture	Auto Body	Building Maint.	Carpentry	Drafting	Electricity	Industrial Arts	Machine Shop	Pl. & Sheet Mtl.	Totals	Unit	Description
1	1	5	12		2	3		1	25	gal.	White Shellac
1	1	3			1	3	1	1	11	gal.	Orange Shellac
		1							1	gal.	Cabinet Rubbing Varnish
		1	3			1			5	gal.	Spar Varnish
1		3	10			1			15	gal.	Flat Lacquer
1		1	10			3			15	gal.	Clear Gloss Lacquer
2		4	20			4			30	gal.	Alcohol
3		10	25			2			40	gal.	Turpentine
1		1	1			2			5	gal.	Linseed Oil, boiled
3		10	20			5			38	½ pt.	Paste Wood Filler, Natural
3		10	10			10	3		36	tube	Natural Plastic Wood
5		13	20			2			40	lb.	Putty
2		5	5			3			15	gal.	Varnish Remover
							1		1	qt.	Ready Mixed Aluminum Bronze Pain
1		5	5			4			15	lb.	PasteWax, Johnson's (in 1 lb. cans)
		4	6			2			12	tubes	Walnut Plastic Wood
		4	6			2			12	tubes	Mahogany Plastic Wood

FIGURE 25.

2. Students are responsible for economy in the use of supplies. All usable small pieces should be used before larger pieces are cut. All small or damaged pieces should be checked by the instructor before they are scrapped.
3. When a stockroom attendant is in charge he is responsible for all supplies issued. He will issue them only upon presentation of a requisition slip signed by the instructor.
4. The stockroom attendant maintains a perpetual inventory of supplies and materials and notifies the instructor of any shortages.
5. The attendant is responsible for the order and good housekeeping in the stockroom.
6. Materials and supplies should be stored in such a manner as to facilitate:
   a. Maintenance in good condition
   b. Issuing quickly and in an orderly manner
   c. Quick inventory
   d. Safety in storing and handling
   e. Safety from fire by spontaneous combustion

Plant and Equipment

This section has been prepared to furnish assistance in making desirable physical provisions for shopwork in unit trade classes. Such a limited treatment of the subject, however, cannot serve every conceivable need or situation that may arise. But the suggestions are sufficiently adaptable to serve as a guide in the development of new shopwork areas or toward the reconditioning of old ones. It is also suggested that in matters concerning lighting, heating, and ventilating, the services of specialists in these fields be obtained.

In order to provide effective instruction the State Board for Vocational Education determines that the plant and equipment of any vocational school or class are adequate to carry out the purpose for which the school or class is established, as follows:

1. Where vocational schools are established apart from the present high school, arrangements should be made for physical and health education, library facilities, and assembly rooms.
2. When shops are built as a part of a secondary school plant, there should be sufficient housing facilities in the plant to provide for this new group of pupils in addition to other secondary school pupils.
3. The school district shall furnish adequate equipment and supplies before opening any shop.

4. The equipment should be installed in space that is adequate, properly lighted, heated, and ventilated to insure safe and efficien operation.
5. Standards for basic equipment requirements, adequate workin space, safe working conditions, and general toolroom facilitie should be established with the counsel and advice of representativ advisory committees and should conform to occupational standard
6. Each student shall have an approved work station and the equip ment shall be comparable to the type most effectively used i industry for the trade or occupation for which training is bein offered. A work station shall be identified as "An area containin sufficient equipment and supplies to provide for continuous pu poseful trade training activity in an outlined course of study o the part of an individual student, not including the necessar auxiliary equipment used by the entire class." The area require per work station may vary according to the trade.

Initial and Continued Approval

Initial approval for Vocational-Industrial Education is given for a on year period. Continued approval of the Vocational-Industrial courses wi be granted from year to year:

1. When the program is operated in compliance with existing Sta and Federal policies and the aims and objectives as set forth in th program.
2. When local school authorities have provided proper and adequa equipment and supplies of the kind used in industry. The equi ment provided will be at least the minimum as recommended by th Department of Public Instruction. Equipment will be maintaine in good condition and will be replaced when wear or obsolescen reduces the training value.
3. When local school authorities have provided properly qualifie and certificated teachers and administrators.
4. When the attendance in a shop is in keeping with the number approved work stations in the shop, and the average daily atten ance does not exceed twenty-five students per shop instructor duri any one shop period.
5. When it can be shown that pupils are being employed in jobs co patible with their training.
6. When adequate provisions have been made for placement and follo up of those completing vocational courses.

7. When the quality of instruction is satisfactory and the methods of instruction fit the needs of the students preparing for specific jobs. As far as possible, instruction should be based on actual production work rather than on exercises.
8. When courses and methods are in keeping with current practices and needs. Each course will be evaluated separately. Thus one shop course may warrant continued approval when another does not.
9. When the required statistical and financial reports have been submitted to the Department of Public Instruction within the specified dates.

Elements Based Upon Local Needs

The most satisfactory and efficient shop is one constructed in conformity with the requirements of the trade in the community rather than one into which work activities must be fitted. Standards for basic equipment requirements, adequate working space, safe working conditions, and general toolroom facilities should be established with the counsel and advice of representative local advisory committees and should conform to occupational standards.

Desirable Characteristics of the Shop

Size and Shape. The floor space required for each shop is dependent upon the requirements of the trade. It should be large enough to provide an approved work station for each student. The enrollment must not exceed 25 trainees per shop instructor. The term "work station" is defined as "an area containing sufficient equipment and supplies which will provide for continuous, purposeful trade-training activity in an outlined course of study on the part of an individual student, not including the necessary auxiliary equipment used by the entire class." The areas required for work stations in the various trades are given in Figure 26, pages 108 and 109.

A rectangular room of which the length is approximately twice the width is the most satisfactory. Posts and other obstructions should be avoided.

Light. Windows on at least two sides of shop, beginning 40 to 48 inches above the floor and extending to ceiling.

FIGURE 26.—Physical Requirements for Vocational School Shops

Shop Activity	*Floor Area per student (sq. ft.)*	*Students per lavatory unit*	*Type floor*	*Illumination level**
Aircraft Engine Mechanics	75	6	Concrete	20
Aircraft Mechanics	130	8	Wood or concrete	20
Armature Winding	50	8	Wood	15
Art Metal	40	15	Wood	30
Auto Body Repairing (Metal)	60	4	Concrete	20
Auto Mechanics	50	8	Concrete	20
Auto Mechanics, Diesel	50	8	Concrete	20
Baking	75	6	Wood	20
Barbering	45	—	Wood, linoleum, rubber	20
Beauty Culture	50	—	Wood, linoleum, rubber	20
Bookbinding	45	16	Wood	20
Bricklaying	100	8	Concrete	15
Cabinetmaking	85	16	Wood	20
Carpentry	130	8	Wood or concrete	15
Commercial Art Illust.	50	10	Wood, linoleum, rubber	30
Dental Technician	40	8	Wood, linoleum, rubber	30
Drafting, Architectural	35-40	15	Wood, linoleum, rubber	30-50
Drafting, Mechanical	50	16	Wood, linoleum, rubber	30-50
Dressmaking	35	16	Wood, linoleum, rubber	30
Electricity Appliance Serviceman	95	10	Wood, linoleum, rubber	30
Electricity	70	8	Wood	15
Electricity, Automobile	40	10	Wood, concrete	20
Electricity, Power	60	10	Wood, concrete	25
Electroplating	50	8	Concrete	15
Foundry practice	100	8	Earth, concrete	20

* Foot-candles.

(Continued on page 109)

Window area should be at least 25 per cent of floor area. A minimu of 10 foot-candles for general lighting. General lighting supplement by local lighting up to 50 foot-candles for close work.

Heat and Ventilation. Automatically controlled temperatures from to 72 degrees, depending upon the nature of the shop activity. A changes from 6 to 10 times per hour. Separate hoods and exhausts f removal of noxious fumes, dust, and gases.

FIGURE 26.—Physical Requirements for Vocational School Shops (Continued)

Shop Activity	*Floor Area per student (sq. ft.)*	*Students per lavatory unit*	*Type floor*	*Illumination level**
Machine Shop Practice	70-80	8	Wood, concrete	20
Meat Cutting	45	8	Wood	15
Merchandising, Grocery	40	8	Wood, linoleum, rubber	15
Millinery	35-40	10-15	Wood, linoleum, concrete	30
Painting and Decorating	80	8	Wood, concrete	20
Painting	45	8	Wood, linoleum, rubber	20
Pattern making, Wood	80	8	Wood	20
Plastering	80	8	Concrete	10
Plumbing	90	8	Concrete	10
Printing, General	60	8	Wood, linoleum, rubber	20-30
Printing, Composition	40-50	8	Wood, linoleum, rubber	30
Printing, Pressman	75	8	Wood, concrete	20
Printing, Stonework	60	8	Wood, concrete	30
Printing, Layout	30	16	Wood, linoleum, rubber	30-50
Radio Repair	50	16	Wood	20
Refrigeration Mechanics	50	8	Wood	20
Sheet Metal	65	8	Wood, concrete	20
Tailoring	40	16	Wood, linoleum, rubber	30
Watch Repairing	35	16	Wood, linoleum, rubber	30
Welding	60	8	Concrete	10
Woodworking, General	80	16	Wood	20

* Foot-candles.

Floors. Material determined by the requirements of the trade. In general, wood, where sharp-edged tools are used; and concrete, where wet or very heavy materials are used. Floors should be nonskid in character.

Doors. Open outward. In shops using heavy or bulky materials one entrance large enough to accommodate trucks.

Teacher's Desk. In the vicinity of the entrance with good shop visibility.

Machinery. Arranged to permit free use of aisles, to utilize to a maximum naturally lighted areas, to provide maximum safety, and to accommodate maximum-sized materials. Machines commonly used in sequential order should be placed in the order of their operation. Dangerous machines should be equipped with effective guards, and all machines controlled by a sub-master switch near teacher's station.

Toolroom and Tool Panels. Located so as to avoid excessive travel. Shoul conform to occupational standards.

Storage Space. Adequate to accommodate standard-sized materials. Larg amounts of lumber, supplies, and materials not accessible to student Should permit storage of materials in such a way as to prevent loss c deterioration. Should be located in shops using heavy or bulky materia so as to be near receiving points.

Wash Basins. Substantial, adequate in number for the nature of the sho activity.

Drinking fountains. Within shop. One to each 15 students.

Blackboard. Not less than 30 square feet in area.

Bulletin board. Facing light.

Lockers. Individual, recessed where possible. In shop, if possible, or room conveniently located.

Color. Color dynamics should be used to the fullest extent.

Tools and Equipment

Selection of tools and equipment should be based upon the followi factors:

1. Comparable to the best used in the local industry
2. Meet the requirements of the job at the most economical cost
3. Variety of makes, sizes, and styles to give widest possible traini
4. All moving parts of power-driven machinery effectively guarde automatic guards preferred
5. All grinding equipment provided with laminated safety glass
6. Machine tools with individual motor drives, controls, and stands

Health and Safety Check List

1. Equipment so located that no shadows are on work
2. Obstructions out of line of light
3. Naturally lighted areas utilized to the fullest extent
4. Blackboard and bulletin board face light
5. General lighting supplemented by adequate local lighting
6. Illumination glare-free
7. Exhaust system for gases, fumes, and dusts
8. Automatic and manual control of heat and ventilation

9. Switches on machines where they may be easily reached by operator but so located as to avoid accidental switching
10. Sub-master switch—controlling power-driven machinery near teacher's station
11. Master switch that can be locked
12. All moving parts of power-driven machines effectively guarded
13. Machines that produce flying particles have laminated glass shields wherever practical
14. Goggles for all activities that involve flying particles
15. Safety zones marked around hazardous machines and work activities
16. Nonskid floor supplemented by mats at hazardous areas
17. Machines fastened securely to the floor
18. Machines so located as to eliminate interference between operators
19. Machines processing pieces located away from exits
20. Stairs, balcony, and dangerous electrical equipment provided with adequate railings
21. Safety waste containers provided for inflammable materials
22. Toolroom, storage room, and shop doors to swing outward
23. Suitable type fire extinguishers conveniently and conspicuously located
24. Well-equipped first aid cabinet
25. Adequate toilet facilities
26. Four-foot minimum general aisles for travel. Wider aisles at exits.

Emphasis on Citizenship

Occupational competency and technical knowledge are primary objectives of the vocational-industrial curriculum. Habits, attitudes, and ideals are secondary outcomes inescapably developed in the informal atmosphere of the shop and laboratory where students work together under conditions approximating those in industry.

In preparing for citizenship the vocational student should be concerned in the shop and academic and related subject classes with such problems as:

1. How the municipal, county, state, and federal governments operate
2. How to solve local problems relating to education, taxation, recreation facilities, health, etc.
3. National problems and their possible solutions
4. International problems and their possible solutions
5. What is propaganda?

6. The workings of American politics
7. How to be objective in discussing social and political issues
8. Our constitutional rights as American citizens
9. What unions stand for, and how they operate
10. The American free enterprise system limited by the common welfare
11. Tolerance of all creeds and races
12. His role and duties as the future head of a family
13. The intelligent use of leisure time—recreation, study for advancement in occupational duties and responsibilities, reading of good literature, sports, etc.
14. Problems of the community, such as juvenile delinquency and crime
15. Occupations—related to the one he is studying
16. How to advance in one's occupation
17. The importance of taking an active interest in community living—voting, attending meetings for the common good, etc.

The positive development of desirable characteristics reflects the work of the good teacher. The following suggestions will be of value in shop and laboratory programs to provide experiences and practices in good American citizenship.

Self-Reliance. The student learns reliance on himself by following detailed drawings and job instructions. Unlike the usual classroom work where students proceed through learning units in a group, vocational teaching in shop and in related work is largely *individualized.* Reliance on self is stressed in the manipulation of tools, and in operating machines. In group discussions industrial organization is explained, and the necessity for self-reliance in after-school work situations. The student learns that eventually he will have to rely on his own abilities for success.

Responsibility. Vocational students are given increasing responsibility for their own behavior, for expressing constructive criticism and ideas for improvements, for making their own decisions, and for assuming responsibilities to the group and to their shop. The student learns that he has rights not only as a worker but also on the job for which he will be paid, and that his responsibility includes good workmanship in his production job as well as conservation of materials, careful use of tools and machines, and adherence to safety rules. These responsibilities are as important as trade skills learned in tool and machine processes.

Through shop meetings led by the students themselves, the problems of the shop and class are discussed and plans formulated for solving them. In this way the students themselves solve such problems as misusing tools, cleanliness in the shop, horseplay, orderliness of the working and storage areas, and safety practices for the individual and class. The necessity for getting along well with each other in the common use of space, materials, and tools is learned in daily practice.

These responsibilities are dramatized daily through concrete applications. Students are given a large share in planning shop activities. Various shop committees which work with the teacher for the governing of shop activities are selected by the pupils. In these meetings of committees, free expression in encouraged, and decisions affecting the group are made by vote.

Cooperation. Working together for the common good is stressed in vocational shop and related work. *Students learn cooperation by helping each other on projects; by helping the teacher maintain order and orderliness; by oiling, cleaning, and making minor repairs to school machines and equipment; by conserving supplies, and maintaining tool and storage areas.*

Vocational students cooperate outside the shop with the school by erecting stage scenery, operating lights and sound effects for assemblies and stage productions, acting as motion picture projectionists, printing schedules and reports, repairing the stage and school furniture, and working with school-wide student committees on the completion of school-wide projects.

Through these activities the vocational student grows in appreciation of the cooperative point of view of workers. He comes to realize that he is a cog in a machine—but that the cog must always function for the good of all concerned, and that through cooperation he becomes a force in the democratic way of life.

The Dignity of Labor. The vocational student learns that a democracy grants the right to labor at work of one's choosing, provided that it does not interfere with the interests of society; that democracy grows stronger on the principle that every worker is important; that the worker is entitled to the dignity due a competent and producing craftsman; that he has the same opportunities for advancement and for earning the respect of his fellows as any other citizen.

Pride in Craftsmanship. A wide variety of useful projects is made in the vocational shop. From inception of design to manufacture, students learn the proper use of tools, machines, and materials so they can enter their lifework after graduation as potential craftsmen who are proud of their creative abilities and salable skills, happy in their chosen occupations, satisfied with their trades, and their contribution to society. The student learns in the shop that *everybody works.*

Progressiveness. In those parts of the world where craftsmen have not been given the recognition due their worth, we find a great scarcity of the conveniences common in America. There is a higher standard of living where craftsmen do not follow the processes and methods of the older world—but curiously investigate, experiment, and substitute to devise means and methods of utilizing materials and machines for better devices and products. Learning the American way of industry is manifest in vocational-industrial teaching. Here the American freedoms have actual meaning, bred by the American procedure of talking it over with the boss and fellow workers at the bench, trying it out, and then putting into practice and production new ideas, methods, processes, and materials.

Leadership and Followership. The development of leadership in vocational education is brought about through democratic committees elected by the class members, which function in the improvement of shop and class conditions. Not only does the student learn to lead by leading, but he also learns to follow a leader intelligently. Problem-solving by committees is a continuing activity because many unforeseen difficulties arise in shop work. *Students learn to take part in discussions, to make constructive criticisms, to listen attentively and objectively to the opinions of others, and to compromise where unanimous assent is lacking.* Each student may act as a foreman, stock-room man, and in other capacities where he receives concrete experience in leading and in following. He learns through experience what techniques help or hinder the leader. He learns how to take and to give orders intelligently. He can lead in skills and knowledges about his particular trade, and he can also follow, and learn why he follows, in these same activities.

Self-Expression. Shop students translate their own ideas into plans and those plans into material objects. Self-expression is thus learned in the shop and classroom through the medium of objects planned and brought into being by the student himself. In this way beauty in design

and utility of purpose are learned in the vocational shop, where self-expression has many tangible outlets in individual and group projects.

In related subjects classes and in shop committee meetings, the vocational student learns to think on his feet, to contribute to the discussion in the solving of various problems, in the selection and manufacture of various projects.

Safety Consciousness. The modern school shop is a miniature of a modern industrial plant; hence it is necessary to set up safety rules for the protection of the student workers. The shop-elected safety committee formulates the procedures to protect body and health. The resultant safety behavior patterns enable the student to recognize potential hazards. This safety practice transfers from school to industry. Only through the operation of machines and the manipulation of tools properly guided by an efficient teacher can the student learn about accident hazards common to our industrial society.

Illustrative Unit 1
CONSERVATION OF MATERIALS

A Typical Practice in Citizenship Education in the Vocational School.[1]

SITUATION: A considerable spoilage of materials and damage to equipment and tools due to carelessness had created a shop problem.

PROCEDURE: The instructor suggested that a committee be elected by the group as a whole to investigate any excess waste of material or damage to tools and machinery. The work of the committee involved investigating the cause of the waste or damage, finding out the cost of the materials or equipment involved by means of an interview with the vocational director, preparing a written report on the incident, and presenting the report to the shop group for consideration and discussion. The result was a noticeable improvement in the care with which tools and equipment were used and a decided drop in the quantity of materials wasted.

OUTCOMES: Conservation of metals and other materials used in the shop work, appreciation of costs and materials and equipment as applied to production, realization of the cost of vocational education to the taxpayer, and a respect for public and private property.

[1] Department of Public Instruction, Commonwealth of Pennsylvania, Harrisburg, *Educating for Citizenship*, Bulletin 242, 1949, pp. 229-230.

Democratic Means of Student Participation in Shop Problems: Th shop teacher should encourage students to solve shop problems rathe than to arbitrarily assign extra duties to students. The following un is typical.

Illustrative Unit 2
THE CLEAN-UP SITUATION[1]

SITUATION: Assigning of clean-up and other shop duties.

PROCEDURE: The teacher called a meeting of all shop boys and discusse the shop clean-up situation with them. At his suggestion, the boy volunteered to accept entire responsibility for shop clean-up. The elected a shop foreman who presided at a meeting in which they decide what the various clean-up duties would be. The foreman appointed secretary, whose responsibility it was to prepare a list of the duties named by the group as a whole. The shop foreman made all clean-u assignments for a two-week period and supervised all work of this typ

In addition, it was suggested that the shop foreman assume the r sponsibility for the shop in the temporary absence of the teacher. H also worked with the teacher in planning, assigning, and supervisin the work done in the shop, and assisted lower grade students in doin fundamental operations which he had already mastered. He assisted th instructor in giving daily grades on the work which he had supervise

The job foreman was rotated among the more advanced and responsib students by two-week periods.

OUTCOMES: Abiding by the will of the majority, developing habits behavior based on democratic principles, forming habits of cooperati and compromise in getting along with others, sharing of responsibiliti of shop management by students.

Citizenship Training in Related and Academic Subjects. The stude in the vocational related subjects and academic classes learns the inform way of gathering together for purposes of discussion in the Engli classes, where his thinking is stimulated through talking with othe In related science the student learns of life in the past as contrasted w present-day living, how to apply scientific principles to his life, a how men's lives can be made happier. In related mathematics he lea

[1] Department of Public Instruction, Commonwealth of Pennsylvania, Harrisburg, *Educa for Citizenship,* Bulletin 242, 1949, p. 230.

ot only the calculations required in his trade, but the market value of oods, budgets, interest, loans and credits, and the value in dollars nd cents of work well done. In history classes the vocational students arn of the work of the early settlers who first established rural and rban communities in a wilderness, of the principles on which this ountry and state were established, and, above all, his obligation as a tizen to maintain the freedoms enjoyed by other workers before him.

The Shop as a Force in Citizenship Training. There is no better place r a boy to learn how to become a worth-while social being than in the ocational shop. As he puts into practice what he has learned, he will preciate the high standard of work required of the mechanic in an utside shop. He can appreciate these standards only by meeting such quirements in his daily work.[1]

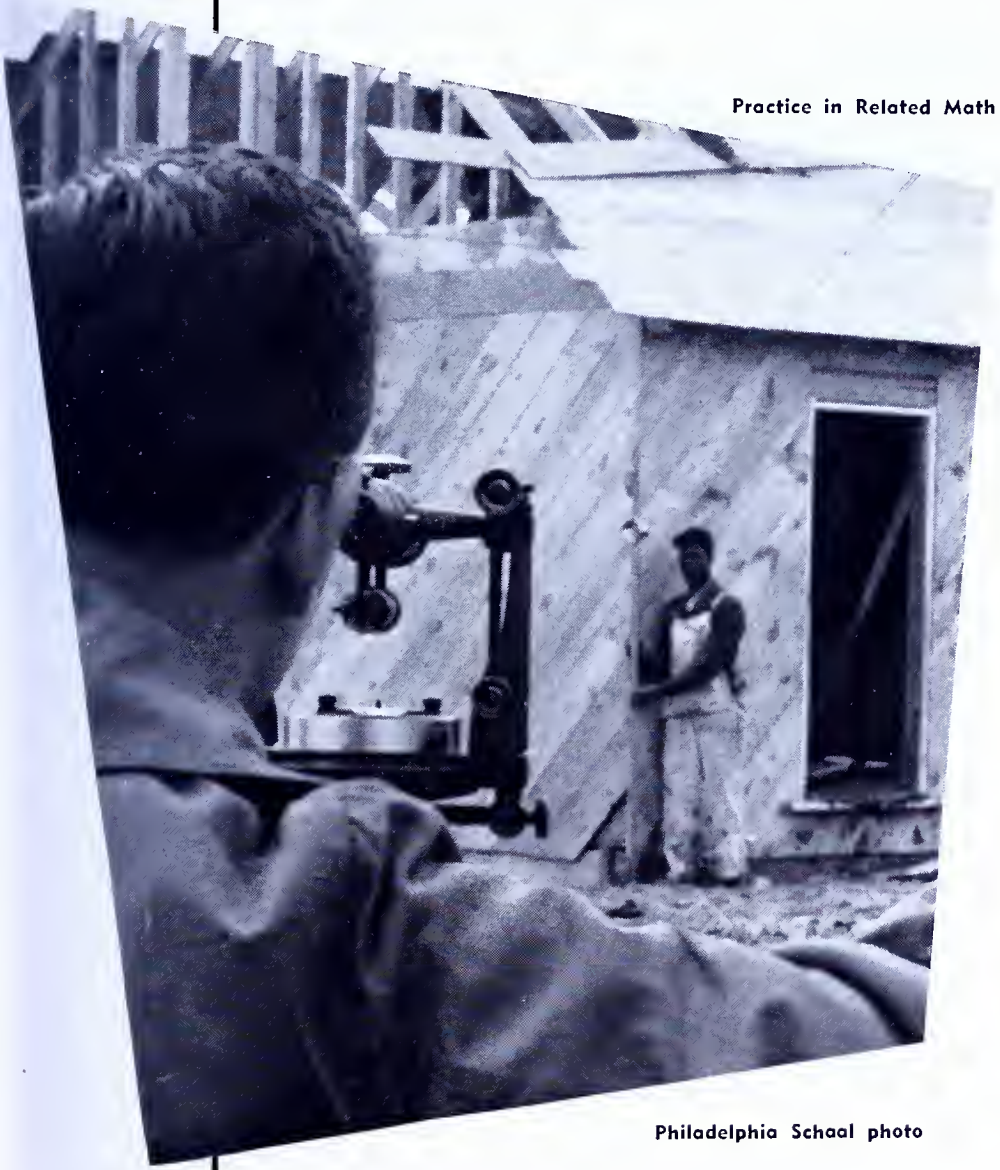
Outstanding among the good citizenship qualities learned by the ocational student in the shop, under the guidance of a competent teacher, e these:

1. Development of good personal habits in relation to democratic procedures
2. Practice in a cooperative project of problem-solving
3. Active participation in improving school and shop procedures, policies, and equipment
4. Critical and constructive thinking on school problems
5. Abiding by the will of the majority
6. Developing habits of cooperation and compromise in getting along with people
7. Sharing the responsibility of shop management
8. Conservation of tools, equipment, and materials
9. Accepting the responsibilities of a school citizen

[1] Department of Public Instruction, Commonwealth of Pennsylvania, Harrisburg, *Educating for Citizenship,* Bulletin 242, 1949, p. 225.

V

Related Instruction in Vocational-Industrial Education



Practice in Related Math

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Related Subject Matter Content

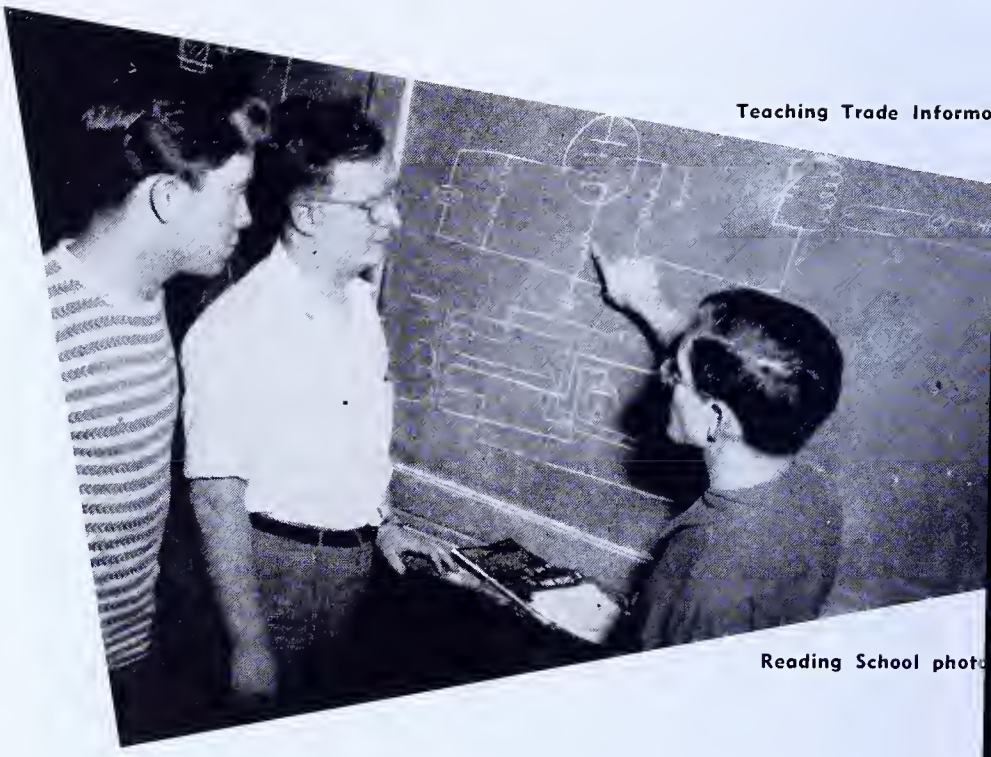
Methods of Teaching

Physical Features of a Related Classroom

Qualifications of Teachers of Related Subjects

Administering and Supervising the Related Program

Evaluation of Related Instruction



Teaching Trade Informa

Reading School photo

V
Related Instruction

IN THE analysis of many trades it has been determined that a trainee must know certain technical information in order to become a successful journeyman in the trade. Learning an occupation requires two types of activities. One consists in the development of skills or the learning of actual operations, processes, and techniques while working in the school shops. The other, with which we are primarily concerned in this section, comprises subject matter which cannot be readily taught on the job, but which is vitally important because it is an aid to the learner in *understanding the fundamentals of the entire occupation.* It is, therefore, not enough that a vocational school develop the manipulative skills of the pupil. It should also produce intelligent and resourceful workers who are not only able to perform the manipulative requirements of the trade, but also able to perform them according to high standards and with understanding.

This information, or body of subject matter which cannot be readily taught on the job, is known as *related* or *supplemental* instruction. It can be defined as that instruction which has a specific application to the job, but which is broader in scope than actual job instruction since it includes the study and understanding of the principles and the scientific foundation upon which the actual job operations are based.

In the generally accepted sense, and for purposes of reimbursement, related information is embodied in the subject matter courses of mathematics, mechanical drawing and blueprint reading, and science. These subjects when correlated closely with the practical shop instruction help the pupil to acquire skills and also to obtain the necessary technical knowledge which is essential in the performance of those skills.

The related technical instruction is supplementary to the practical instruction. It is, therefore, apparent that the aims for related instruction will follow closely the development of the pupil in his school shopwork. Although the following aims are specific and directed toward the development of the pupil as a proficient worker in the trade, the broader aims would include development of the pupil to meet his present and

future needs as a member of the community and to advance his wo in his chosen trade. The objective:

In Mathematics as related to the trade is to develop the ability of t trainee to make all necessary calculations required in trade practi

In Science as related to the trade is to aid the trainee in developing knowledge of scientific principles and facts which concern the materi and tools of the trade and the work to be performed, and to devel the application of scientific principles to actual trade problems.

In Drawing as related to the trade is to develop in the trainee t ability to interpret or to construct drawings, or to do both in accordan with trade requirements.

Related Subject Matter Content

If the content of the related subjects is to be effective and attainm of specific objectives is to be achieved, subject matter content must evo from analysis of the trades which are being taught. Since the instruc of the related subjects is not generally a skilled tradesman as is the sh instructor, the development of subject matter content for related instr tion through analysis of the elements makes collaboration between two instructors advisable. In addition to the cooperative efforts of related subjects instructor and shop instructor, the cooperation of me bers of representative trade advisory groups, including employers a employes, should be obtained in the development and approval of subject matter content. Through this procedure supplementary mate and related content will be developed, which becomes an integral p of the education of the pupil. As mentioned before, in addition to c petency as a tradesman, attention must be given to the development the individual as an effective community participant and to supply him with sufficient information so that he is prepared to advance in trade. Therefore the course content of related instruction should enriched beyond providing the minimum essentials for job performa

Related Mathematics

A sound program of related instruction develops from the pract elements of the trade and the future needs of pupils. Since the appl tions are not concrete in the courses offered in the standard high sch the courses are not adaptable to pupils who are preparing to e industry. However, it is not intended that the instructor attempt

troduce a completely new kind of mathematics for vocational industrial pils. Fundamentally, the principles of arithmetic, algebra, geometry, d trigonometry are common whether taught in nonvocational classes or cational classes. However, related mathematics should be taught by ing specific problems that are taken from the everyday work of the ade. The application of plane trigonometry in the setup of the dividing ad of a milling machine, or the use of algebraic equations in determin-g the resistance of an electrical circuit are examples. Many other practi-l examples and applications may be found in every phase of industrial perience which will embody the principles of mathematics.

The following is a brief outline of subject matter, intended only as a neral example, and as such is not completely applicable to any one ade. Related subject courses for specific trades may be planned in the me manner to meet the specific requirements of the trade. Related bject content as it pertains to each trade will appear in subsequent lletins on the trades taught in the public schools of Pennsylvania.

RELATED MATHEMATICS

1. The knowledge of mathematical processes is indispensable if pupils expect to become efficient in trade practice. The specific aim is to produce a mechanic who is adept at making all the necessary mathematical calculations encountered in his everyday work experience. Vocational school pupils must have a foundation in mathematical processes either prior to or during their period of training. The amount of fundamental mathematics given in any related mathematics course will be dependent upon the previous knowledge the pupil possesses, and the specific trade requirements.
2. Mathematics for certain calculations should include
   a. Calculations needed for the planning of jobs and job operations
   b. Calculations necessary when using tools and equipment
   c. Problems required for calculating material costs, weights, etc.
   d. Problems needed for calculating time, wages, labor costs, overhead, marketing costs, profits, etc.
3. The following is a brief list which may be specifically adapted for a course of related mathematics for the machinist's trade:
   Mathematics required for calculating
   - Screw threads
   - Gears, gear proportions, gear ratios, etc.
   - Speeds and feeds of various types of machines
   - Measurement of all types of stock
   - Cutting strokes of planers, shapers

Micrometer and vernier readings
Straight and taper turnings
Indexing
Job operation time for various machines
Wage scales, wage progression, etc.
Overhead such as power, light, heat, wear, salaries, etc.
Profits

Related Drawing and Blueprint Reading

Mechanical drawing is considered the universal written language industry. Vocational students preparing to enter the industrial f should receive very thorough instruction in the many different ph

Drawing for Carpen

Pittsburgh School pho

elated to their particular trade. Industry abounds in problem sources or related drawing, blueprint reading, and sketching. Shop drawing, patterns, castings, and parts, which in many instances can be obtained rom local industries for little or no cost, are much more valuable as levices in the teaching of visualization than the use of mechanical drawng exercises which are to be copied by the student. The primary bjective of an adequate course in related drawing should be *visualization.* By visualization we mean that the over-all aspects of the object, part, or iece are to be seen in relation to its size, shape, material, and its use in elation to other parts. The secondary objective should then be the makng of simple shop sketches which in time will be evolved into technical ketches, until a point of skill and knowledge is reached that will enable he pupil to make complete detail and assembly drawings.

Related drawing as taught with respect to vocational school students ıay include:

1. Blueprint reading
2. Lettering and geometrical construction
3. Sketching
4. Mechanical drawing
5. Parts drawings
6. Isometric drawing and sketching
7. Pictorial drawing

The following objectives for related drawing for machine shop stuents are suggested:

1. *Blueprint Reading*
   a. To develop ability to visualize an object as to shape and size
   b. To develop an analysis of views
   c. To determine the number of parts
   d. To understand the relation of parts to each other and to the whole
   e. To know the relation of parts as to size, material, etc.
   f. To be able to take figures, materials, etc., from plueprints
2. *Lettering and Geometrical Construction Skills to Be Learned*
   a. Lettering—types. purposes, etc.
   b. Simple geometric construction
      (1) Inscribing a triangle, perpendiculars, etc.
      (2) Bisecting lines and angles
      (3) Finding centers from points on circumference, perpendiculars, tangents, etc.

3. *Sketching—Skills*
   a. Ability to make shop sketches of simple machine parts
   b. Measurement of simple objects
   c. Placing of dimensions on sketches
   d. Making of sketches in orthographic projection from sin machine parts
   e. All necessary lettering, etc.
4. *Mechanical Drawing—Skills*
   a. Ability to use drawing instruments in the construction of sin detail and assembly drawings from sketches already made
   b. Practice in the construction of drawings which include redu scales, sections, titles, bills of material, lettering, etc.
5. *Parts Drawings*
   a. To make drawings of threads, levers, and conventional resentations
   b. Detail and assembly drawings in orthographic projection small machine parts
6. *Isometric, Pictorial Drawings, and Sketchings—Skills*
   a. Drawings of simple objects by use of instruments
   b. Practice in freehand isometric and pictorial drawings

Related Science

Industry contains many examples of the practical application of fundamental principles of physics, general science, chemistry, mechanics. Through the related sciences these principles can be expla by concrete problems taken from the trade which the vocational stu is studying. In this manner a student will be much better equippe solve the varied problems that will confront him in his trade. Thro the proper acquaintance of the student with the practical knowledg scientific principles and applications, the student's imagination and tive powers may be stimulated to make contributions to his industrial

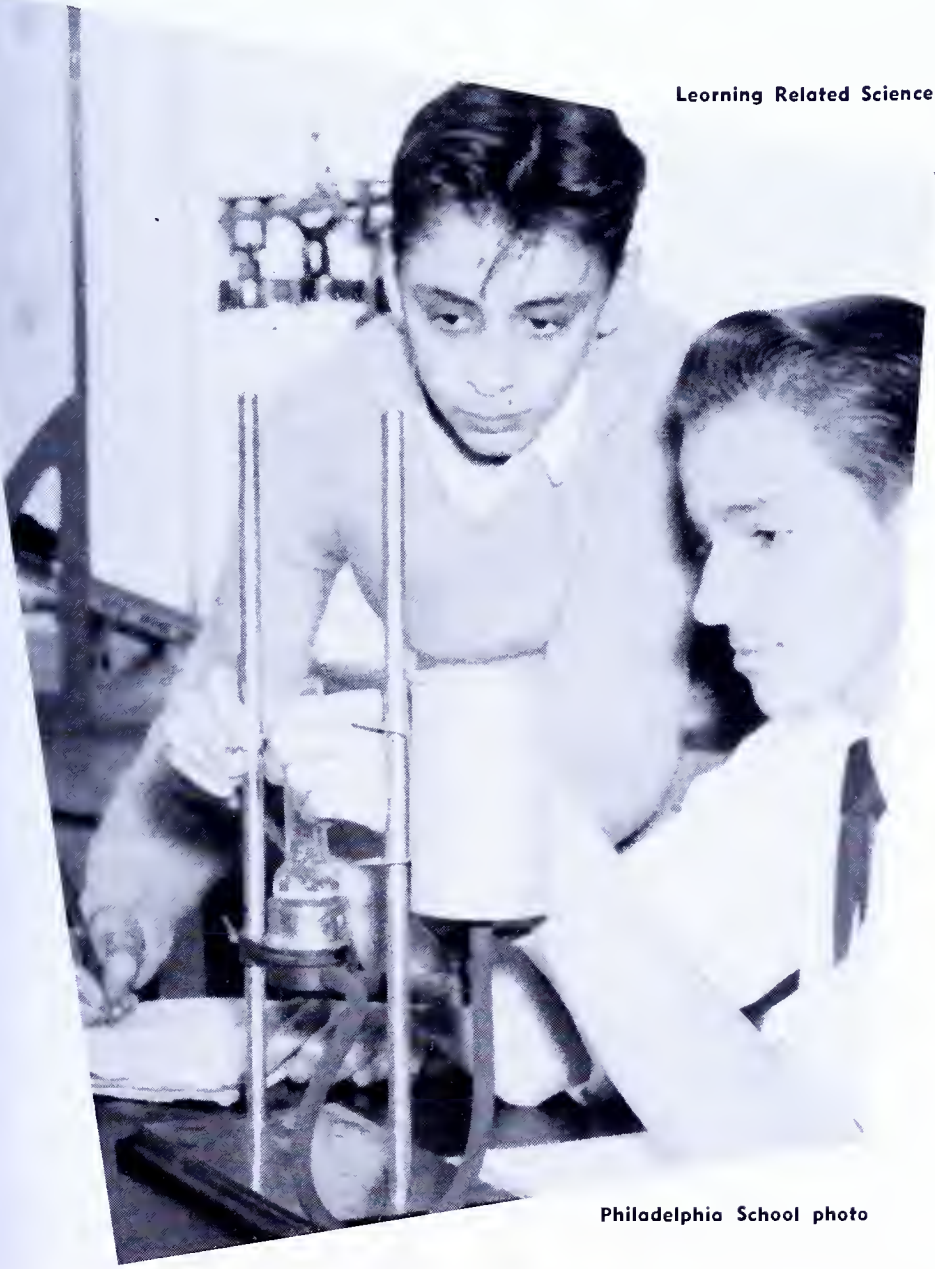
A course of study in the related sciences should embody fundam knowledge of scientific principles necessary for a student to kno become efficient in his trade. Some items generally considered fu mental in the related sciences are:

1. Properties and mechanics of solids, liquids, gases, light, heat, so magnetism
2. Introduction to force, motion, energy, power
3. Study of simple and complex machines

4. Principles of electricity
5. Chemical elements and compounds

To these fundamentals and others, depending on the trade activity, ore advanced principles might be offered:

1. Power units and the transmission of power



Leorning Related Science

Philadelphia School photo

2. Mechanical movements, linear and circular
3. Application of mechanical processes, liquids, gases, friction, lu cation, heat, combustion, magnetism, electricity
4. Chemistry of materials
5. Strength of materials

As examples of the specific application of these fundamentals as apply to a trade, the following titles might be included in a rel science course for machinist students:

1. The comparative operations of various machines used in the mac shop and their comparative cost of operation
2. Power and power transmission by use of shafts, pulleys, belts, g clutches, etc., with respect to single power unit drive, mul drive, and motor drive
3. Study of motion, circular and linear
4. Analysis of shop machinery with regard to motion and transmi of power, speeds, ratios, etc.
5. Principles of hydraulic presses and jacks, steam and gas eng air compressors, etc. Compare them for efficiency of operation
6. The effects of proper and improper lubrication, heat and fric bearings, cutting tools, belts, pulleys, etc.
7. The effects of heat on metals—tempering, case hardening, wel brazing, soldering, etc.
8. The chemistry of fuels, refractory materials, etc.
9. Scientific principles involved in metal shaping processes
10. Strength of materials to cover tension, compression, ben twisting, etc.

Methods of Teaching

The teaching of related subjects requires a knowledge and exper of several methods of teaching. It is not possible to standardiz method of instruction. The method used effectively in one instance not be effective in another. In any case the approach to the teachi a subject is influenced by:

1. Teachable content
2. Facilities for giving instruction
3. Age and physical status of the students
4. Mental capacity of the students
5. Nature of the lesson or subject
6. Experience and ability of the teacher
7. Time available

Another influencing factor which a related subjects teacher must nsider in determining the method to be used is the student grouping ithin a given class period. Frequently, students of various trades and a certain grade level are grouped in a single class. For example, a nth grade mathematics class may be composed of students from three four different trades. If the instruction is to be effective and applicable the trade, the instructor must select methods of instruction which will ovide for these differences. In similar manner, the problem of teaching lated subjects is complicated when students of the same trade but of fferent grade levels are grouped in the related classes.

One excellent method of meeting these individual needs in related bjects is to use the "contract method," by which subject matter is ganized into units and students proceed from one unit to the next they complete the preceding unit. Teaching devices, such as informa- on sheets, assignment sheets, and problem sheets, are needed to supple- ent individual instruction. A liberal supply of reference material and sual aids should be available to students.

Certain fundamentals of science, drawing and mathematics which are und common to all trades may be presented to groups without considera- on of the trade which they are pursuing. Instruction may also be given small groups who are pursuing the same trade and who have reached point in the course of study where the information is applicable to . The demonstration method, telling and showing, is an effective aching method for group instruction. Another effective teaching ethod for instructing groups is through the conference method in which dents gather in groups and arrive at conclusions through directed cussion.

Other methods of instruction may be found to be applicable and quite isfactory in meeting the needs of the individual students. However, atever method is used, instructional devices and aids should be avail- le to make the instruction realistic and functional. Reference is made the use of mock-ups, models, exhibits, machines, testing and demon- ating apparatus, motion pictures, slide films, etc. Occasional field trips o industry tend to relate the classroom instruction with industrial wage- ning trade practices.

Physical Features of a Related Classroom

The related classroom should have adequate storage space for mater of instruction, such as assignment, information, and problem she Provision should be made for a reference library. The room arrangen should be conducive to a satisfactory grouping of students working similar work. Tables which can be moved and arranged to advan are recommended. The room should also include all the laboratory possible, such as models, mock-ups, machines, charts, pictures. Provi should be made to darken the room in order that slide and mo picture equipment can be used. These, along with the standard requ ments for any classroom, provide opportunity for the classroom instru to conduct an effective related subjects program.

Qualifications of Teachers of Related Subjects

In general practice, mathematics, science, and drawing are taugh segregated classrooms by instructors other than shop instructors. Auxil information is usually taught by the shop instructor in the shop at the when it is most needed for efficient performance of the practical Consequently, the qualifications of the classroom instructor are diffe from those of the shop instructor.

Basically, the related class instructor is a qualified teacher of ma matics, science, or drawing. In practical application, it is desirable the teacher of related subjects have had some industrial experi which should be in the trades he is teaching. It is recognized th teacher of these subjects would not likely have sufficient work exper in all the trades for which he is offering instruction. However, n can be done to increase his qualifications through in-service tea education. Opportunity should be provided for the teacher of re subjects to visit the shops to gain an insight into the jobs being formed. Consultation on the development of course content with shop teachers should be encouraged. Study of trade analyses will inc his knowledge of the trade and the related subjects principles tha involved. Visits to industry and summer employment in the occupa which are being taught are valuable experiences.

It is recommended that auxiliary information or related technic formation should be taught by the shop teacher who is skilled in his

nd knows not only what skills must be developed, but also what trade nowledge must be learned to perform those skills.

These are qualities required of teachers of related subjects that may e considered as differentiating them from academic teachers. General ualifications, such as patience, thoroughness and good citizenship, are ualifications of all professional-minded teachers.

Administering and Supervising the Related Program

The problem of establishing an efficient related or supplementary aining program requires much consideration. If the related training rogram has been planned or initiated in a haphazard manner, it will raduate students who find themselves handicapped in the practice of ieir trade. An effective program of related instruction depends largely n the development of a comprehensive course of study. Teachers of elated instruction and practical shop teachers are specialists in their wn fields. Each has something to contribute to the other teachers, and me must be allowed for consultation. Teachers of related subjects ould be given the opportunity to visit the shops and to become familiar ith the shop projects in order to determine to what extent principles mathematics, science, and drawing are involved. Shop teachers should fer specific problems to the instructors of related subjects. The administrator should recognize the importance of these phases of vocational ducation and should provide for close cooperation by means of visits uring regular school hours and through staff meetings.

Correlation of the related subjects with the practical shop teaching ust be maintained and coordinated by the administrator working with e instructors in the development of course content. Correlation can st be secured through close cooperation.

ime Allotment for Related Subjects

In the development of the curriculum for Vocational-Industrial Educaon the administrator must proportion the time to be allotted to shopork, related instruction, and general academic instruction. The amount time allotted to shop instruction is regulated. At least fifty per cent the school day must be devoted to shopwork. This minimum has been tablished by law. The time allotted for related subjects is variable and dependent upon the relative amount of time needed to build a well-

rounded course of study as well as upon the requirements of the tr involved. Generally, the related instruction time varies from 20 per c to 30 per cent of the total weekly instruction time. Variations will oc due to the differences in trades as well as differences in related infor tion needed from one year to the next within the trade.

Evaluation of Related Instruction

The following evaluative criteria are not only devices for use in supervision of the instructor of related subjects, but also self-check devices for the teacher in evaluating his own instruction. The items suggestive and not necessarily exhaustive. It is recommended that criteria be supplemented or adapted to meet specific conditions.[1]

Evaluative Criteria for Related Instruction

1. Instruction is offered to segregated groups.
2. The instruction is related to the trades or occupations offered in local program.
3. The teacher has a course of study and is following it.
4. The teacher uses daily lesson plans in detail as a means of attain the aims and objectives of his course.
5. The teacher has devised and is using special training aids.
6. The teacher provides for individual differences of his students
7. The teacher visits the homes of his students.
8. The teacher visits school shops to see how he might better re his subjects to the shopwork.
9. The teacher seeks the assistance of the shop teachers in vitali his related instruction.
10. The teacher understands his place and relationship to other teac and administrative personnel in the personnel organization char submitted to the evaluation staff.
11. Bulletin boards contain current clippings and pictures relate the subject or subjects being studied.
12. Students present written reports about products manufacture the school shops.

[1] See *A Procedure for Evaluating a Local Program of Trade and Industrial Education* a accompanying forms, American Technical Society, Chicago, Illinois, 1952.

13. Students are given practice in making graphs and charts as a means of presenting technical information.

14. Students are taught how to use statistical tables and other special features in locating specific information in handbooks and other technical books or pamphlets.

15. The classroom, laboratory, and drawing room are equipped with the necessary instructional materials to teach effectively the subject as it applies to each trade or occupation offered.

16. The classrooms, laboratory, and drawing room are well-managed as shown by the following:

a. Every student has a work station
b. The morale of the class is good
c. Discipline of the class is good
d. Students are engaged in purposeful activity
e. The housekeeping is good

17. The classroom, laboratory, and drawing room are well-supplied with reference materials.

18. The classroom, laboratory, and drawing room are well-planned and laid out for instructional purposes.

19. The classroom, laboratory, and drawing room are provided with adequate natural lighting.

20. The classroom, laboratory, and drawing room are provided with adequate, modern artificial lighting.

21. The teacher has developed teaching aids of various types which assist him in reducing learning time in teaching students.

22. The teacher has developed methods and devices for measuring the accomplishments of his students in terms of the aims and objectives of the subject of instruction.

23. The teacher makes constructive suggestions to the director of vocational education for the improvement of the vocational industrial department.

24. The teacher assumes responsibility and leadership for at least one extracurricular school activity.

25. The teacher understands his place and relationship to other teachers and administrative personnel in the personnel organization chart as submitted to the evaluation staff.

VI

General Education Instruction in Vocational-Industrial Programs

Practice in House Construction

Williomsport School photo

Subject Matter Content

Methods of Teaching

Physical Features of the Academic Classroom

Qualifications of General Education Teachers

Administering and Supervising the General Education Program

Evaluative Criteria for General Education Instruction

Learning to be a Waitres

Pittsburgh School photo

VI

General Education Instruction

THE goal of Vocational-Industrial Education, as indicated previously, is to produce a good citizen and competent worker—economically. socially, emotionally, and physically. Toward this end the curriculum has developed the individual through practical shop instruction and through the study of those subjects which are closely related to it. Emphasis has been placed on skills and knowledge of the trade, and also on those characteristic traits which enable the student to succeed in his chosen occupation as a worker and as a citizen.

In the further development of the student, the curriculum provides opportunity for study in subject matter content which is not directly related to the trades. This subject matter is usually referred to as "non-vocational," "academic," or "general education" subjects, and includes English, social studies, and health and physical education. The objective:

In English is to offer the individual opportunities for maximum growth in the use of language as a tool and as a medium of self-expression and appreciation.

In Social Studies is to develop good citizens—to assist students in a better understanding of the economic structure of society, and to create a desire to participate in the social order.

In Health and Physical Education is to give the pupil adequate instruction for improving his own health practices in order to make him a competent worker, a good citizen, and to insure a vigorous, and happy personal, family, and community life.

Through the attainment of these objectives and those indicated for shop and related instruction, opportunity is provided for students to meet the general objective for Vocational-Industrial Education.

Subject Matter Content

It is recommended that general education courses include such material as will have a direct relationship to the trades taught. The application of the material taught in the general education subjects to the trade

in which the pupil is interested should have the greatest appeal, and co sequently maximum learning will take place. For example, in a class English, emphasis placed on shop and trade literature would probab have greater value and appeal than emphasis on English literature. is not to be inferred from this statement, however, that general educati courses should be entirely related to the trades; only when applicati can logically be made to the respective trades should this be done.

English

English for vocational pupils should include all phases of speakin reading, writing, listening, and critical thinking. The ability to read a to interpret what has been written is fundamental to success in scho and later as a tradesman and a citizen. It is recommended that diagnos tests be used to determine speed and comprehension in reading. If t results indicate the need, remedial work should be given.

Many of the trade publications contain valuable information. Th should be used as reading references. In addition to reading technologi publications that are applicable to the trade, the student should encouraged to read for recreation during leisure hours. Attention sho be given to the development of his appreciation in classical and c temporary literature. The ability to use acceptable oral and writ English may develop through the submission of reports—either writ or oral—on readings from recommended newspapers, magazines, a books.

The course in English should include some instruction in the use of dictionary, the encyclopedia, the trade publications, and the use of library card catalogs. The pupil should not only know of the existe of such material, but should know how to find and use it. Pract experience in the school shop will create a demand for specific infor tion. General education instruction should help to develop vocati students into self-reliant, educated workers.

Course content in English may vary according to the trades represen The following basic skills are indicated as desirable, and should be cluded in the course in English for vocational pupils:

English for Vocational Pupils

Tenth Year

1. Review of fundamentals of grammar
   a. Sentence structure—simple, compound
   b. Punctuation
   c. Capitalization
   d. Use of irregular verbs
   e. Personal pronouns
   f. Double negatives
   g. Tenses of verbs
2. Spelling—trade terms and general words
3. Use of dictionary, library, encyclopedia, and other references
4. Vocabulary study, especially antonyms, synonyms and homonyms, and words confused and misused
5. Written and oral composition
6. Group discussion and parliamentary procedure
7. Reading from recommended references. (Suggest current and trade literature)
8. How to study

Eleventh Year

1. Review of fundamentals of grammar, including work covered in the tenth grade. Complex sentences, figures of speech, secondary tenses of verbs, drills on agreement of subject and predicate, and review of punctuation
2. Spelling—trade terms and general words
3. Vocabulary development
4. Oral and written composition, including
   a. Letters—business and social
   b. Reports—trade and literary
   c. Speechmaking
   d. How to conduct meetings
5. Research techniques
6. Reading from recommended references

Twelfth Year

1. Fundamentals of grammar as need arises
2. Spelling as required
3. Vocabulary development
4. Written composition
   a. Technical reports
   b. Instructions
   c. Safety and accident reports

d. Reports of field trips
e. Letters of application for employment
f. Book reports
g. Writing for school newspaper
h. Business and social letters
i. Completing questionnaires and application forms

5. Oral Expression
   a. Talks for special occasions
   b. Interviews
   c. Job applications
   d. Complaints
   e. Adjustments
   f. Reports on and discussion of radio broadcasts
   g. Debating
   h. Conferences and panel discussions
6. Reading for pleasure and trade information. Dramatization of son reading

Social Studies

Competency in the skills of a trade is not sufficient to maintain emplo ment. Good personal relationships and ability to get along with fello employes and immediate superiors, are as essential as skill. Therefo civic and social adjustments should be emphasized, along with the dev opment of trade skills and factual knowledge. The specific aim of soc studies is to develop good citizenship qualities.

Each student is a community participant. As such he should be co cerned not only with his own welfare, but should recognize that he is integral part of the community, the state and the nation, and must b good citizen in order to participate successfully in this complex socie To function as a good citizen he must be well informed and have t basic qualities of understanding and open-mindedness. He should taught to think critically, and to appreciate the viewpoint of others w whom he is associated.

It is important that the student be given the opportunity to obt sufficient background knowledge, that he be able to understand a appreciate the American way of life and the principles upon which t government was founded and is operating. Therefore, within the progr of social studies, provision should be made for the student to gain su cient information about government as it functions on the national, st and local levels.

As a worker and a wage earner in society he should have a knowledge of how to acquire the necessities and comforts of life. As a consumer of goods and eventually a family provider he must know values and basic economic theories. He should be familiar with basic economic principles, how they influence activities, and how they will continue to influence man. The program of social studies should also include information on economic principles or these may be included in a course of Economics for vocational pupils more closely associated with the needs of the students.

The student as a worker will take an active part in production in industry. He should know the history of the development of industry in general, and specifically the history of the development of the industry in which he is working.

The following suggestions for the Social Studies Course may be expanded to meet local needs and conditions. The teacher can contribute greatly to developing in students better social attitudes, better understanding of the economic structure of society, and a desire to participate as worthy citizens of our society.

Tenth Grade

Industrial History

1. World History of Industry
   a. Methods of manufacture prior to the Industrial Revolution
   b. Effects of the Industrial Revolution—causes and results
   c. Capitalism
   d. Development of the Labor Movement
   e. Developments leading to modern industry—methods and machines
   f. Social, political, and economic results of industrial organization and development
2. Industry in America
   a. Growth from colonial times to the present
   b. Industry as the political-social backbone of America
   c. Evolution of the component parts of the present structure of American industry—contributions of labor and management
3. Industry in Pennsylvania
   a. Growth and extent of development in comparison with other states
   b. Types of industries represented
   c. Social, political, and economic significance
   d. Labor organizations and labor leaders

4. Industry in the local area
   A study of industry within the area being served by the loc vocational-industrial program is recommended, including hi tory, products, extent of productivity, industrial leaders, labo (organized and unorganized), labor leaders, methods of pr duction

Eleventh Grade

Industrial Economics

1. Definition of economics
2. Basic economic principles and their application
3. Characteristics of our economic system
4. Economics as it pertains to the citizen as a consumer, worker, i vestor: banking, interest, insurance, rent, stocks and bonds, wage prices, and credit
5. Free enterprise—its meaning, function, profit motive, and marke
6. Meaning of production
7. Significance of specialization
8. Consumer demands for goods and services
9. Function of money
10. Changing prices, inflation, deflation, pricing process
11. Distribution of income, wages
12. Labor and management problems
13. International economic relations

Twelfth Grade

American Government

1. National Government
   a. Historical background
   b. Federal Constitution
   c. Legislative, executive, and judicial branches
      Function; members, how elected or appointed; term of offi duties; and powers.
   d. Miscellaneous services and activities of the National Gove ment
      Postal service, copyrights, patents, trade marks, armed for and social security.
   e. National finance: taxes, money, banks, etc.
   f. Types of government: advantages in living under our dem cratic form of government
   g. International relationships
2. State Government
   a. Function in relation to the Federal Government
   b. State Constitution

c. Organization and function of legislative, executive, and judicial bodies
d. State financing, source of funds, taxes
e. State services

3. Local government
   a. Types and organizations—county, township, city, town, borough
   b. Governing bodies, election and function
   c. City government
      Mayor, council, commission, city-manager
   d. Administrative departments—functions, and problems
4. The citizen and his responsibilities in national, state, and local governments (See Emphasis on Citizenship, Chapter IV, page 111).

Health and Physical Education

The program of health and physical education aims to insure a vigorous, happy personal, family, and community life. It stresses the importance of clean living, and the need for a sound body to perform duties as a tradesman and citizen.

Through the program of health education, students are alerted to those dangers of living which tend to affect mental and emotional stability and physical abilities. Success on a job depends upon being physically, mentally, and emotionally fit as well as upon having a wholesome personality.

Physical education emphasizes body building through formal exercises and organized competitive games. It is important to understand the physical development of youth during adolescence and to provide exercises which will limit fatigue and develop strong, healthy adults.

A program of physical education should result in the further development of the student's personality. In organized play the student recognizes that others have abilities to a greater or less degree, and that respect and appreciation of abilities of others are desirable personality qualities which may be applied in his life as a student, wage earner, and citizen. Other values of equal importance are fairness, honesty, and respect for the rights of others. Competitive sports can be controlled only through established rules and regulations To function as a participant the student must conform to these rules and regulations. Students as workers and citizens will be subjected to rules, regulations, laws, and other social controls, and in order to be worthy members of society they must acquire self-discipline and control. The program of physical education aims to develop these personality qualities in youth—as well as to develop strong bodies.

The following outline is a guide for the teacher in the developmen a program of health and physical education:

Health and Physical Education

1. Improving personality through observance of health habits
   a. Definition of personality
      Personality rating
      Improving personality rating
   b. Physical appearance and grooming
   c. Mental health and behavior
   d. Medical examination
2. Summer vacation and leisure time health hazards
3. Vocational hygiene
   a. Follow-up of medical examination
   b. Importance of testing for aptitude and personal interests
   c. Industrial safety
   d. Hazards of sedentary employment
4. Effects of alcohol, tobacco, narcotics, and stimulants
   a. Physiological effects
   b. Psychological effects
   c. Habit formation
   d. Results on personality, job performance, and emotional stab
5. Communicable diseases
6. National health problems
7. Community health problems
8. Health and social agencies
9. Patent medicines
10. First aid
11. Accident prevention in the home and on the job
12. Marriage problems and social hygiene
13. Personality and mental health
14. Home care of the sick
15. Physical development through calisthenics, gymnastics, and or ized play

Methods of Teaching

Teachers of general education subjects must have knowledge and in using several methods of instructing. Variation in course con individual student differences, and the other factors discussed in Ch VI, page 137, makes it essential to adapt methods to provide maxi learning. Basically, the teaching should be influenced by the interes the students, and aimed to meet the objectives of vocational educa

s well as those of the general education subjects. Consideration must lso be given to the nature of the whole vocational-industrial curriculum, vhich emphasizes pupil activity, freedom of expression, resourcefulness, ndividual initiative, and cooperative effort in the solution of problems. These elements tend to eliminate the use of the lecture method except for imited presentation of new subject matter.

The Project Method

Effective teaching has been accomplished through the use of the project nethod as applied to English and social studies. Through this method pupils work individually or in groups on assigned problems. Opportunity is given for using individual initiative and resourcefulness in cquiring information, and for cooperatively arriving at conclusions. Organized group conferences may be held to discuss procedure to be followed in gathering information from various sources, to review findings f specific and individual assignments, and to develop conclusions or to ummarize. In the further development of the individual student, and s evidence of achievement, the findings may be presented orally, or as written presentation, or both. This method may be applied, for example, n the study of

1. Labor legislation
2. Wages
3. Social security
4. Local, State, and National government organization and function
5. Field trips
6. Preparation of reports—accident and technical

ndividual Assignments

Instruction on an individual assignment basis is frequently desirable n specific content. Instruction sheets of various types are developed to upplement the instruction of the teacher. An example of a typical assignment sheet in the social studies field follows:

Insurance

esired Results and Objectives:

To learn to understand the purpose of insurance and to become acuainted with available insurance plans

Assignment:

1. Nichols, F. G., *Junior Business Training for Economic Living,* pag 373–383, 384–389, 1941
2. ZuTavern, A. B., and Bullock, A. E., *Business of Life,* revised ec tion, 1943
3. Crabbe, E. H., and Salsgiver, P. A., *General Business,* pages 341–3(1947
4. Study the questions below. The answers can be found in the refe ences given above. Check with your instructor to see if the answe are to be written on a standard answer sheet. If you are in dou about the correct answer to any question, consult your instructo
   a. Define: *Term insurance, ordinary life insurance, limited payme insurance, endowment insurance, annuity insurance, and gro insurance*
   b. What type of policy would be best for you at the present tim Give reasons.
   c. What is the usual budgetary figure given for insurance?
   d. What are the two purposes of life insurance?
   e. What is meant by "cash surrender value"?
   f. What is meant by "loan value"?

The Discussion Method

The discussion method may be used to present subject matter cont and to attain specific objectives. Various forms of the discussion meth such as formal debating, panel discussions, conference methods, and dividual oral reports followed by group discussion, will encourage its u

Audio-Visual Aids

To supplement instruction, it is further recommended that visual a such as motion pictures, slide films, charts, maps, and graphical and p torial presentations be used. It is desirable that students should le how to prepare graphs and charts to portray information which they h accumulated.

A detailed description of these methods is not intended here.

Physical Features of the Academic Classroom

The physical features of the academic classroom are similar to th prescribed for the related subjects classroom. It is recommended tables or movable desks be used so that an arrangement can be m to provide for group study and conferences. Movable arm chairs are isfactory if tables or desks are not available.

An abundance of reference material should be available with adequate ıling space and shelves. Provision should be made for darkening the oom for film showing. Sufficient bulletin board space should be available o provide opportunity to exhibit the results of projects.

Qualifications of General Education Teachers

In addition to the required certification standards for teaching eneral education subjects, it is desirable that these teachers have an ppreciation and understanding of the objectives of vocational education o that the teaching of the general education subjects will be of greatest alue in the development of vocational students as wage earners and itizens.

These teachers should have a cooperative attitude toward vocational ducation in general, and more specifically, should work cooperatively vith the teachers of related and shop instruction and with the vocational dministrative staff.

Administering and Supervising the General Education Program

Describing the function and position of the vocational industrial administrator is somewhat complicated because organizational features at ıe local level vary. In some instances Vocational-Industrial Education s segregated in a separate vocational school, but in most cases it is a epartment of the high school. As a segregated unit, the general educaion teachers, like the shop teachers and the teachers of related subjects, re under the vocational-industrial administrative and supervisory staff. Vhen Vocation-Industrial Education is a department of the high school, ıe administration and supervision of the general education subjects may r may not be delegated to the Director of Vocational-Industrial Educaion and his staff. Therefore, the director may have direct control of the eneral education subjects according to delegated authority or he may erve only in an advisory capacity to those who have direct control of ıese subjects.

Evaluative Criteria for General Education Instruction

1. The teacher is well prepared and is certificated to teach subjects
2. The teacher is following the course of study

3. The teacher uses daily lesson plans in detail as a means of attaining the objectives of his course.

4. The teacher provides for individual differences of the students.

5. The teacher seeks the assistance of shop and related teachers in vitalizing his subject.

6. Bulletin boards contain current clippings and pictures related to the subject or subjects being taught.

7. Students present written reports about products manufactured in the school shops.

8. The teacher attempts to relate materials of instruction to the vocational interests of the students.

9. The classroom is equipped with the necessary instructional materials to teach the subject effectively.

10. The teacher utilizes effectively many audio-visual and other teaching aids, such as models, mock-ups, films, slides, pictures, maps, globes, and museum materials.

11. Students are taught how to use the preface, table of contents, index, statistical tables, and other special features in locating specific information in a book.

12. The classroom or laboratory is well managed, as evidenced by
    a. Good morale
    b. Good discipline
    c. Work station assignments
    d. Purposeful activity for all students
    e. Good housekeeping

VII

Extracurricular Activities in Vocational-Industrial Education

Becoming Proficient in Foundry Work

Philadelphio School photo

Organizing the Extracurricular Activities Program

Promoting Interest in the Extracurricular Activities Program

Pittsburgh School photo

VII

Extracurricular Activities

THE program of extracurricular activities includes those activities carried on by pupils in addition to regular curricular subjects. They may be scheduled at a convenient time during or after the regular school day. The extracurricular activity selected by pupils for enjoyment and benefit provides opportunity to play or work with associates or friends, and serves as a source of self-expression. For some students the activity is a source of escape from routine or from undesirable working or living conditions.[1]

Since the program of extracurricular activities is designed to meet pupil interests, it must necessarily be broad enough to include a number of different activities. For example:

1. *Clubs*
   a. Photography
   b. Glee clubs
   c. Safety and first aid
   d. Dramatics
   e. Crafts
2. *Athletics*
   a. Varsity
   b. Intramural
3. *Orchestra*
4. *Band*

Through participation in this program, the student becomes interested in some avocational hobby or activity which will enable him to make profitable use of his leisure time not only while he is a student but also as an adult worker. Through the activity of his choice the student has opportunity to develop such traits of character as leadership, cooperation, respect for the rights of others, sportsmanship, appreciation, and other qualities growing out of group participation.

Organizing the Extracurricular Activities Program

Generally students are free to select any club activity which is a part of the entire high school program. No attempt is made to departmentalize these activities, and vocational-industrial students may be participating in an activity with students from several different curriculums. This

[1] F. T. Struck, *Creative Teaching*, John Wiley & Sons, Inc., New York, New York.

association is encouraged as a typically democratic procedure. Basically, these activities are organized because pupils have shown an interest in them. The program should be so flexible that when a sufficient number of students indicate a particular interest, the activity can be included if other conditions warrant it. Other conditions which affect the organization of the activities are:

1. Sympathetic interest and support of the administration
2. The availability of a competent sponsor from the teaching staff
3. Suitable housing and equipment

The teacher sponsoring the activity acts as an adviser, and gives assistance when needed. Since the activities are informal, the sponsor should encourage students to elect officers and establish whatever organization is necessary for the proper conduct of the activity.

Promoting Interest in the Extracurricular Activities

In order to arouse student interest in the extracurricular activities program, students may be encouraged to visit the different club meetings and to observe the activity when the clubs present assembly programs.

Homeroom teachers have opportunity during homeroom periods to become better acquainted with their pupils and to advise and encourage them to select an extracurricular activity. Time permitting, the homeroom teacher may conduct informal discussions on the values to be gained through participation in these activities, or have students explain what is being done in the club in which they are members. The teacher, as leader and adviser, can do much to stimulate participation and interest in these activities.

VIII
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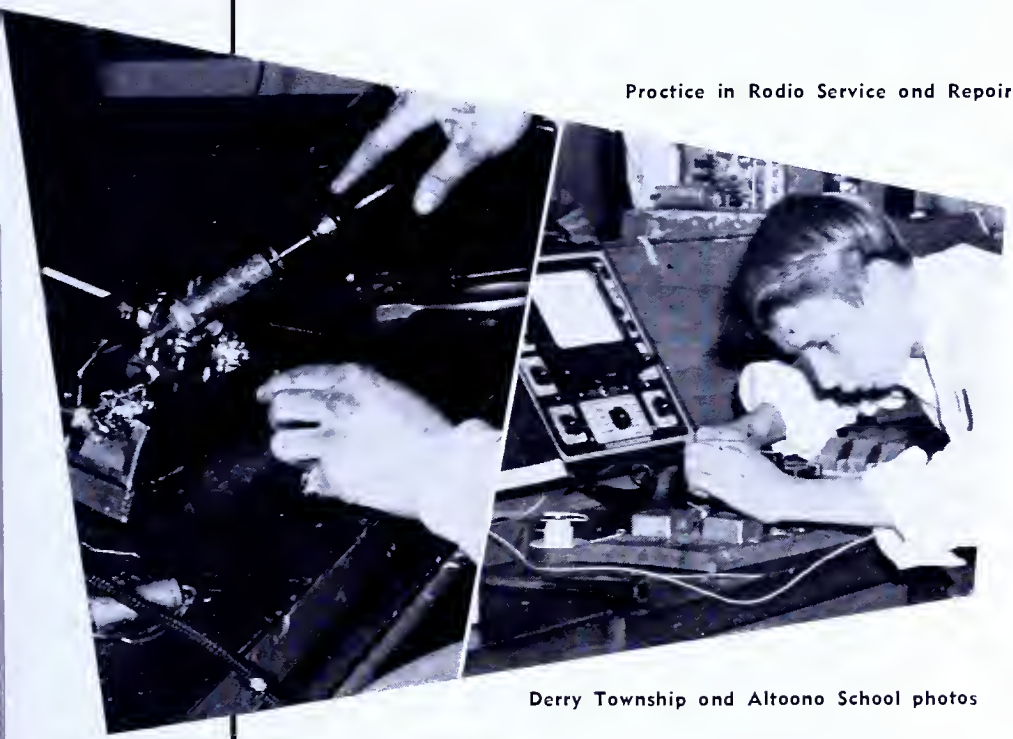

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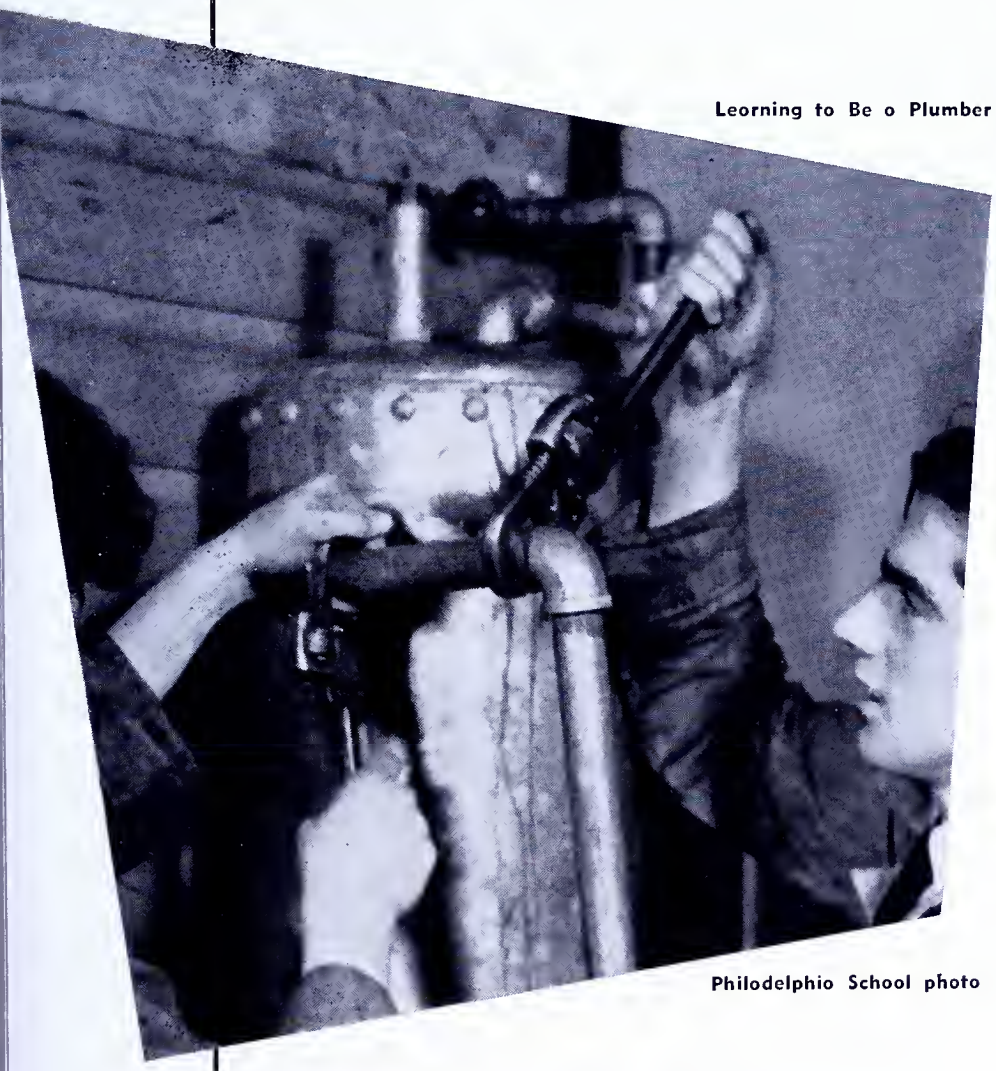
Appendix

Federal and State Legislation Affecting Vocational Education



Leorning to Be o Plumber

Philodelphio School photo

Federal Legislation

Smith-Hughes Act
George-Reed Act
George-Ellzey Act
George-Deen Act
George-Barden Act

Pennsylvania State Legislation

Appendix

FEDERAL AND STATE LEGISLATION AFFECTING VOCATIONAL EDUCATION

In recognition of the need for Vocational Education the Congress of the United States passed a number of acts for the purpose of promoting Vocational Education of less than college grade. The Commonwealth of Pennsylvania subsequently passed legislation accepting and supplementing the federal acts. The following is a digest and summary of the more important legislation, both federal and state, which has contributed toward the advancement of Vocational Education:

Federal Legislation

. Smith-Hughes Act

a. Approved February 23, 1917 (Public Law No. 347, 64th Congress). This is the basic act since it contains many provisions which have been made to apply to later acts.

b. Provides for the allotments of federal funds to be matched by State and local funds for the salaries of teachers, supervisors, and directors of agricultural subjects, and for salaries of teachers of trade, home economics, and industrial subjects.

c. Provides for the allotments of federal funds to be matched by State or local funds for the training of: teachers, supervisors, and directors of agricultural, trade and industrial, and home economics subjects.

d. This act is still in effect.

e. Provisions of Act accepted by Commonwealth of Pennsylvania. (See Act of General Assembly, approved July 11, 1917, P. L. 757.)

.. Extending Act (Smith-Hughes)

a. An act extending the provisions of the Smith-Hughes Act to Hawaii, approved March 10, 1924 (Public Law No. 35, 68th Congress).

b. The act authorized an annual appropriation to be used for the same purposes and under the same conditions as the funds appropriated by the Smith-Hughes Act for use in the states.

c. This act is still in effect.

3. George-Reed Act

a. Approved February 5, 1929 (Public Law No. 702, 70th Congr
b. Authorized the appropriation of additional funds for use by states and territories for vocational education in agriculture home economics.
c. In general, the conditions of the Smith-Hughes Act applie work done under this act.

4. Extending Act (Smith-Hughes)

a. An act extending the provisions of the Smith-Hughes Act and supplementary acts to Puerto Rico, approved March 3, 1931 (I lic Law No. 791, 71st Congress).
b. Authorized an annual appropriation to be used for the same poses and under the same conditions as the funds provided by Smith-Hughes Act for use in the states.
c. This act is still in effect.

5. George-Ellzey Act

a. Approved May 21, 1934 (Public Law No. 245, 73rd Congress)
b. This act replaced the George-Reed Act.
c. Authorized, for a period of three years, appropriations to states and territories for vocational education in agriculture, h economics, and trades and industries, to be extended under general provisions of the Smith-Hughes Act.

6. George-Deen Act

a. Approved June 8, 1936 (Public Law No. 673, 74th Congress).
b. This act replaced the George-Ellzey Act in 1937.
c. Authorized the continuous annual appropriations for use by states and territories, including Alaska and the District of Co bia.
d. Provisions made for the services covered by the Smith-Hughes plus funds for education in the distributive occupations.
e. Exceptions made to the conditions of the Smith-Hughes Act cluded a change providing for the matching of federal funds a graduated scale starting at 50 per cent and reaching 100 per in 1947.
f. Provisions of Act accepted by Commonwealth of Pennsylva (See Act of General Assembly, approved May 28, 1937, P. L. 10

George-Barden Act

a. Also known as the Vocational Education Act of 1946, approved August 1, 1946 (Public Law No. 586, 79th Congress).
b. This act amended the George-Deen Act and contains many new provisions. The chief characteristic as contrasted with previous vocational education legislation is its flexibility.
c. The amounts of the annual appropriations for a number of new phases of work were included in this act.
d. This act authorizes certain appropriations for Vocational-Industrial Education but requires congressional action biannually.

ATE LEGISLATION APPLYING TO VOCATIONAL EDUCATION

tions of Pennsylvania School Laws
plicable to Vocational-Industrial Education

The following abstracts of certain sections of the School Law are esented to facilitate the reader's review of the law as it applies to cational-Industrial Education. For full information refer to the sec-ns of the law, noted in brackets at the close of each abstract, in *School ws of Pennsylvania, 1949,* Bulletin 2, Commonwealth of Pennsylvania, partment of Public Instruction, Harrisburg.

finitions—Vocational Education

Defines State Board for Vocational Education, vocational education, cational industrial education, vocational agricultural education, voca-inal distributive occupational education, vocational homemaking edu-ion, vocational school and department, vocational evening class, part-ne schools or classes, part-time cooperative vocational education, etc. 301]

te Board for Vocational Education; Executive Officer; Employes.

Designates the Superintendent of Public Instruction as the executive cer of the State Board for Vocational Education. Provision is made for executive officer to appoint such assistants as are necessary in carrying t the provisions of the act. [1802]

ties of the State Board for Vocational Education; Reports.

Describes the duties of the State Board for Vocational Education and quires that this Board shall make a report to the Governor annually scribing the progress of vocational education during the year and also ll make such recommendations as the board may deem advisable. [1803]

Schools or Classes, Supervisors, Principals, Instructors, etc.

. . . The State Board for Vocational Education shall provide for S regional and county vocational schools or classes, with the necessary s in accordance with the State Plan for Vocational Education, approve the Federal Board for Vocational Education . . . [1804]

Instruction in Theory and Practice.

Provides opportunity for vocational schools or departments to instruction in day, evening, or part-time classes, and establishes a age of 14 years for those who attend these classes. [1805]

Administration by School Districts.

Any school district may, through its board of school directors,

1. Establish vocational industrial schools or departments.

2. Receive donations for the conduct of any vocational school d partment or vocational evening classes. Provision is made for local b of directors to administer such donations.

3. Require a deposit fee of $10.00 from each person enrolled in ev vocational schools or classes. This fee is to be returned if person rolled has attended 75 per cent or more of the class sessions of the [1806]

Joint Vocational Schools or Departments.

Provides for two or more school districts to establish and ma vocational industrial schools or departments. [1807]

Advisory Committees.

Provides for the establishment of advisory committees compos representatives from local trades, industries, and occupations. I duties of advisory committee. [1808]

Attendance in Other Districts and Other States; Pupils from Other

1. Provides opportunity for residents living in districts which maintain approved vocational industrial education to make appl for admission to any board of education in any other district whic provide the type of training the resident desires. Provision is ma appeal to the State Board for Vocational Education if the applica refused.

2. Any child of school age who resides in any school district which is hree miles or more from the nearest vocational high school in Pennsylania, and transportation is not provided to a suitable school in Pennsylania, may be assigned to a convenient school in another state.

3. The school district in which the person resides who has been admitted as indicated above, shall pay the high school charge or tuition the receiving district.

4. Allows school board directors of districts within this State to accept udents and tuition for these students from districts of other states. [1809]

pproved Local or Joint Vocational Schools; State Reimbursement.

Indicates authority for districts operating approved programs of vocaonal industrial education to receive reimbursement from the State. irects local districts to make such certificates to the Superintendent of ublic Instruction as are required. [1810]

stimate of Expenses and Reimbursements; Appropriations.

Requires the State Board for Vocational Education to submit an estiate of the amount of money necessary to meet expenditures for vocaonal education.

This estimate to be submitted by the first Wednesday of January of ıy year that the legislature is held. The Legislature bases appropriation ı this estimate. [1811]

ocational School Districts, How Constituted.

Each school district of this Commonwealth shall be known as a vocaonal school district, provided, that all the school districts under the risdiction of the county superintendent shall be considered as one ocational school district. [1821]

oards of Directors of Vocational Schools; Secretary; Treasurer.

The affairs of each vocational school district shall be conducted by the oard of school directors or county board of school directors as the case ay be. The secretary and the treasurer of the local board or county board ıall serve as secretary and treasurer of the vocational school district. 822]

owers and Duties.

Defines duties of boards of directors relative to vocational education. ıcluded in these duties is authorization to:

1. Conduct surveys
2. Alter and amend rules and regulations for the transaction of bu ness
3. Employ supervisors and teachers
4. Purchase, lease, rent, improve, and sell land and to build, repa improve, lease, rent, buy, and sell property
5. Acquire real property by purchase, gift, or condemnation
6. Incur and increase indebtedness and issue bonds
7. Purchase furniture, implements, books, materials, equipment, a supplies
8. Make contracts with counties, cities, boroughs, towns, and scho districts or other agencies
9. Make annual reports to the Department of Public Instruction
10. Exercise such other powers and duties as are necessary to carry i effect the purposes of the act [1823]

Limitation on Powers; Applicability of School Laws.

Limits the powers and duties of vocational school districts to the est lishment, maintenance, conducting, and operation of vocational schools classes when and only when the same have been authorized by the elect of the district. [1824]

Levy and Collection of Taxes.

Power is given to school directors of vocational school districts to l taxes on all property, using as a tax base the assessed valuation of s property. This section of the law indicates time of levy and assessm and procedure to collect such taxes. [1825]

Determination of Need for Vocational Schools.

Whenever it is determined by resolution of the State Board for Vo tional Education that a need exists for vocational education in any l district, the State Board will transmit a copy of the resolution to the bo of directors of such district. [1826]

Action of Board of Directors of Vocational Schools.

Requires that each board of directors of vocational schools shall on the establishment of vocational schools, departments, or classes accordance with the recommendations contained in the resolution of State Board for Vocational Education. [1827]

Elections on Establishment of Vocational Schools.

Indicates procedure for obtaining the approval of the electorate. [18

Joint Vocational Schools, Departments or Classes.

Provision is made whereby two or more school districts may establish, construct, equip, furnish, and maintain joint vocational schools, departments, or classes. [1829]

Rules and Regulations; Pupils from Other Districts.

The State Board for Vocational Education shall prescribe rules and regulations for the organization, management, and control of such schools. Provision is made whereby such schools shall receive pupils from other districts so far as their facilities will permit, provided the rate of tuition is determined and paid in accordance with provisions of this act. [1830]

Definitions—Extension Education

Defines extension education, curricular course of study or activity, extracurricular course of study or activity. [1901]

Permissive and Required Free Extension Education.

Boards of school directors shall provide free extension education in any curricular course of study or activity if a written application signed by fifteen or more residents is presented. [1902]

When and Where Provided; Eligibility; Limitations.

Extension education may be provided in school buildings at any time not in conflict with regular day school activities and elsewhere at any hour of any day except Sundays or legal holidays. The board shall not be required to admit to extension classes a person who is in actual full-time attendance at any public or private school during the day. Boards of directors may close any class when the average attendance for any month falls below ten. [1903]

Deposit Fee.

Allows school boards to levy a deposit fee to be returned if the student attends 75 per cent or more of the class sessions. [1904]

Vocational Education for Out-of-School Youth and Adults.

The board of school directors of any school district, when requested in writing by 20 or more out-of-school youth or adults having an administratively feasible educational objective, which has been provided for in the State Plan for Vocational Education for which facilities are available, shall inaugurate and maintain such programs so long as enrollment conditions warrant. [1922]

Vocational Education and Rehabilitation Programs; Conversion for Oth Purposes, etc.

The trustees of any State teachers college with the approval of t Department of Public Instruction and the Governor, may cooperate wi municipal, State, Federal, and other agencies in vocational education a rehabilitation programs in the furtherance of national defense and po war activities. Power is granted to enter into agreements, lease the whc or any part of the real property or to convert the whole or part of o or more of such State teachers colleges for any other State purpose. [200

Payments on Account of Vocational Curriculums.

Indicates that every school district, regardless of classification, shall paid by the Commonwealth for each school year $35.00 per pupil average daily membership in vocational industrial curriculums. [2504]

Payments on Account of Approved Vocational Extension Classes.

Reimbursement to district conducting vocational extension classes w be to the extent of 80 per cent of the sum expended by the districts teachers and supervisors. To compute reimbursement, the maxim compensation shall be $2.50 per hour and the amount expended for pervisory salaries shall not exceed 20 per cent of the sum expended teachers salaries; Provided, That in special cases when travel time unusual preparation of instructional materials or other factors result an inadequate compensation, the Department of Public Instruction n approve additional reimbursable employment time for such additio services upon the submission of adequate substantiative evidence fr the responsible superintendent of schools. [2507]

Distribution of Federal Funds for Vocational Education.

Provides authority for the State Board for Vocational Education establish rules and regulations governing the administration and tribution of any additional Federal funds. [2508]

(4) *Vocational or Other Extension Tuition Charge.*

Explains method of computing tuition for nonresident trade exten pupils. Add the salaries of administrators, supervisors, instructors, cl and custodians specifically employed in the school district's or vocati school district's annual program of vocational or other extension ed tion, the cost of textbooks, and supplies of the second class issued for

program. A charge of 5 cents per pupil hour of instruction for the district overhead and plant usage. Subtract from the sum so obtained the amount of State appropriation applicable. The remainder shall be designated as the "district cost for vocational or other extension education." Determine the total pupil hours of instruction, divide the "district cost for vocational or other extension education" by the total pupil hours of instruction. The cost so determined shall be the "vocational or other extension tuition charge per pupil hour of instruction." [2561]

Payments by Districts for Pupils Attending in Other Districts.

For each vocational or other extension pupil attending an extension class of another district, the receiving district shall bill the sending district if the attendance is previously approved by the sending district and the sending district shall pay the vocational or other extension tuition charge per pupil hour of instruction for each hour of attendance of each pupil.

Nothing herein shall prohibit the payment of a tuition for vocational or other extension pupils by a nonresident adult, sponsoring agency, or employer. [2562]

Certificates of Expenditures for Vocational Schools.

Indicates that the school directors of each district conducting vocational education shall present a statement of the amount expended during the school year previous to the first day of July of that year. This report is to be submitted by the tenth day of July of each year. On the basis of such statement the Commonwealth will reimburse the school districts in accordance with provisions of the act. [2513.1]

Vocational Education.

Outlines the duties and powers of the Department of Public Instruction. [2810]

Acceptance of Smith-Hughes Act for Vocational Education.

Accepts the provisions of the act of Congress approved February 23, 1917. Designates the State Council of Education to act as the State Board for Vocational Education. [2905]

Acceptance of George-Deen Act for Vocational Education.

Accepts the provisions of the George-Deen Act of June 8, 1936, for the further promotion of vocational education.

Designates State Treasurer as the custodian of the Federal appropriation.

Designates State Council of Education as the State Board for Vocationa Education. [2906]

Additional Schools and Departments.

Permits local boards of school directors to establish, equip, furnish, and maintain other schools or departments in addition to the elementary public schools. Among those listed are Trade Schools, Vocational School and Technical Schools. [502]

Teachers of Applied Arts and Vocational Subjects.

Teachers of applied arts and vocational subjects who hold a standard certificate shall be entitled to the same minimum salary and increments as teachers who hold a college certificate. [1144.1]

Teachers of applied arts and vocational subjects who hold a standard certificate and have earned an additional 30 semester hours of credit in professional education in the teaching field in which said teacher is engaged or related thereto shall be entitled to the same minimum salary and increments as teachers holding a Master's Degree.

Part of Public School Standards.

Extension education shall be an integral part of the public school system and of the district in which it is organized. It shall be under the supervision of the superintendent of schools of the county or of the district, as are all other public schools of that district. The State Council of Education shall establish standards for the qualification and certification of extension teachers and supervisors and all other matters pertaining to extension education. [1906]

Definitions—Reimbursements.

1. Standard Reimbursement Fraction. The most favorable State reimbursement is obtained if a district functions as a vocational school district as may be seen by a comparison of the computation of the standard reimbursement fraction.

2. School district: standard reimbursement fraction. Subtract from $3450 an amount determined by multiplying the school district's valuation as determined by the State Tax Equalization Board by .004 and dividing the difference so obtained by $3450.

3. Vocational school district: standard reimbursement fraction. Subtract from $3450 an amount determined by multiplying the school d

trict's valuation per district teaching unit as determined by the State Tax Equalization Board by .002 and dividing the difference by $3450. [2501]

Deductions from State Appropriations.

If any school district wherein a pupil resides who is entitled by law to attend an extension class or high school in another district neglects or refuses to pay such tuition, the Superintendent of Public Instruction is authorized to deduct from any moneys due any such district out of State appropriations the amount due from such district to the district where the pupil attends and pay over said sum to the district entitled thereto. [2564]

Learning Cosmotology

Philadelphia School photo

Practice in Commercia

Allentown School pho

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